ASSESSMENT OF THE DIETARY PATTERN, EATING BEHAVIOUR AND GASTROINTESTINAL SYMPTOMS OF CHILDREN WITH AUTISM SPECTRUM DISORDER AMONG CAREGIVERS AT SELECTED SPECIAL SCHOOLS IN CHENNAI.

Dissertation submitted to

THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY

CHENNAI-600 032

In partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE IN NURSING

OCTOBER – 2017

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SIGNATURE OF THE EXTERNALEXAMINER

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Certified that this is the bonafide work of

Ms.D.Jyothsna

II Year M.Sc., Nursing

M.A.Chidambaram College of Nursing

V.H.S., T.T.T.I. Post, Adyar,

Chennai -600 113

Signature----------

Prof.Dr.Mrs.R.Sudha, R.N., R.M., M.Sc(N)., Ph.D

Principal and Professor in Nursing

M.A.Chidambaram College of Nursing

V.H.S., T.T.T.I. Post, Adyar,

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Approved by the Dissertation Committee in June - 2016

PROFESSOR IN NURSING RESEARCH

Prof.Dr.Mrs.R.Sudha, R.N., R.M., M.Sc(N)., Ph.D.
Principal and Professor in Nursing
M.A. Chidambaram College of Nursing
V.H.S., T.T.T.I. Post, Adyar,
Chennai - 600 113. _____

CLINICAL SPECIALITY EXPERT

Ms. R.Chitra, R.N., R.M., M.Sc(N).
Reader in Nursing
M.A. Chidambaram College of Nursing
V.H.S., T.T.T.I. Post, Adyar,
Chennai - 600 113. _____

MEDICAL EXPERT

Dr. T.Ravikumar, MBBS, DNB(Ped), PGDip(Adol Ped), PhD (Ped)
Senior consultant in Pediatrics,
KKCTH, Nungambakam,
Chennai-600 034 _____

Dissertation submitted to

THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY

CHENNAI-600 032

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ABSTRACT

INTRODUCTION

Autism Spectrum Disorder is a clinically heterogenous neurodevelopmental disorder that manifests as a persistent impairment in social interaction and social communication, with repetitive or stereotyped behaviours that range from mild to severe. Children with Autism Spectrum Disorder presents with unique nutritional challenges and nutritional deficiencies that often lead to poor dietary pattern which lacked the recommended nutrients important for proper growth and development. Along with the poor dietary pattern, they also has problem in eating behavior and gastrointestinal symptoms.

STATEMENT OF THE PROBLEM:

A study to assess the dietary pattern, eating behaviour and gastro intestinal symptoms of children with Autism Spectrum Disorder among caregivers at selected special schools in Chennai.

OBJECTIVES OF THE STUDY

1. To assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder
2. To find the correlation between the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder

3. To find the association between the dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder with demographic variables of caregivers and children with Autism Spectrum Disorder.

METHODOLOGY:

Research approach was exploratory in nature. Descriptive research design was used for this study. The study was conducted among 60 caregivers of children with Autism Spectrum Disorder. The study was conducted in Swabhimaan- Holistic Solutions for Autism, Palavakam, Life Help Projects, Neelankarai and Aikya Foundations, Mount road, Chennai. Non probabaility purposive sampling technique was adopted to select the samples based on inclusion criteria. Self administered questionnaire was used to collect the demographic data of caregivers and children with Autism Spectrum Disorder. Self administered check list was used to collect the data regarding dietary pattern. Interview method was used to collect 24 hours dietary recall. Self administered rating scale was used to collect data regarding eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder from the caregivers.

RESULTS

Twenty (45%) caregivers were in the age group of 25 – 35 years. Majority 59 (98.33%) of the caregivers were females. Majority 54 (90%) of the caregivers were Hindus. Of the total samples, 17 (28.33%) caregivers were graduates and 16 (26.67%) caregivers were postgraduates. Majority 54 (90%) of the caregivers were mothers. Majority 51 (85%) of the caregivers were unemployed. Twenty (35%) caregivers monthly family income was above Rs.30000/- month and 20 (33.33%) of them earned less than Rs.10000/- month. Thirty (50%) caregivers were belonged to nuclear family and 26 (43.3%) of them were

living as joint family. Thirty three (55%) caregivers had two children in their family. Majority 59 (98.33%) of the caregivers had one child affected with Autism. Majority 47 (78.33%) of the caregivers were non-vegetarian. Six (10%) caregivers had family history of child with Autism

Twenty eight (46.67%) children with Autism Spectrum Disorder were in the age group of 9 – 12 years. Thirty seven (61.67%) children were males. Majority 42 (70%) of the children were first born. Thirty four (56.67%) children were born by cesarean section. Thirty four (56.67%) children were diagnosed at 1 – 2 years**.** Thirty seven (61.67%) children had hyperactivity and 21 (35%) children had learning disability. Majority 46 (76.67%) of the children were non-vegetarian. Majority 46 (76.67%) of the children used to take meals three times in a day.

The assessment of dietary pattern of children with Autism Spectrum Disorder showed that majority 42 (70%) of the children had moderate dietary pattern, 15 (25%) of them had poor dietary pattern. The assessment of eating behavior of children showed that majority 37 (61.67%) of the children had moderate eating behaviour and 5 (8.33%) children had poor eating behaviour. The assessment of gastrointestinal symptoms of children showed that 28 (46.67%) children with Autism Spectrum Disorder had mild gastrointestinal symptoms and only one (1.67%) child had moderate gastrointestinal symptoms. There is a positive, significant correlation between dietary pattern and eating behavior (r= 0.642) at 1% level of significance. There is a negative correlation between dietary pattern and gastrointestinal symptoms (r= -0.464) and also between eating behavior and gastrointestinal symptoms (r=-0.503) of children with Autism Spectrum Disorder at 1% level of significance. There was a statistically significant association between dietary pattern and

gender of the child with Autism Spectrum Disorder at 5% level of significance**.** There was a statistically significant association between eating behaviour and gender of the caregiver at 1% level of significance**.** There was a statistically significant association between eating behaviour and demographic variables of children with Autism Spectrum Disorder such as birth order of the child, co-morbid conditions and meal time frequency of the child in a day at 5% level of significance. There was a statistically significant association between gastrointestinal symptoms and religion of the caregiver at 1%level of significance

CONCLUSION

The study concluded that the children with Autism Spectrum Disorder had moderate dietary pattern, moderate eating behaviour and mild gastrointestinal symptoms. The study proved a significant positive correlation between dietary pattern and eating behavior of children. There was a statistically significant association between dietary pattern and gender of the child and eating behavior with gender of the caregiver. The study also showed statistically significant association between gastrointestinal symptoms and religion of the caregiver. Nurses play an important role in guiding caregivers and families of children with Autism Spectrum Disorder to improve dietary pattern and eating behaviour

CHAPTER I

INTRODUCTION

"Children are our greatest treasure. They are our future"

- Nelson Mandela

"Children are like buds in a garden and should be carefully and lovingly nurtured, as they are the future of the nation and the citizens of tomorrow".

-Jawaharlal Nehru

Autism is hard in every sense of word. Children with Autism are always unique totally, interesting sometimes and also mysterious. Autism is a fatal disease which makes no mark on the outward appearance, physical appearance of a child who looks normal but has developmental impairments. Autism comes from 'autis' a Greek word meaning 'self' which squarely fits the feature of Autism Spectrum Disorder (Volden, 2015)

Autism Spectrum Disorder is a clinically heterogenous neurodevelopmental disorder that manifests as a persistent impairment in social interaction and social communication, with repetitive or stereotyped behaviours that range from mild to severe. Children with Autism Spectrum Disorder typically present delays in language, such as lack of spoken language or inability to sustain conversation, difficulties with social interaction, such as emotional reciprocity and have severely restricted behaviours, including inflexible adherence to a specific routine and obsessive like interests (American Psychiatric Association, 2012). Symptoms of Autism usually begin before the age of three and continue throughout the person's life. The symptoms are present from early childhood and affect daily functioning.

Autism is rising alarmingly throughout the world. The overall estimated Autism Spectrum Disorder prevalence was 11.3 per 1000 (1 in 88) children aged 8 years. The prevalence rates being significantly higher among boys (18.4 per 1000 or one in 54) than girls (4 per 1000 or 1 in 252) with the ratio of four in one (The Autism and Developmental disabilities Monitoring (ADDM) - Centers for Disease Control and Prevention (CDC), 2008). It was found throughout the world of all racial, ethnic and social backgrounds (CDC, 2014).

The current prevalence of Autism Spectrum Disorder in world population is estimated to be 1%. The prevalence is 1.5% in United States, 1% in the United Kingdom and slightly higher in Asian countries (like India), ranging from 1.81% to 2.6%. Prevalence estimates of autism spectrum disorder have shown a steady increase during the last five decades. The prevalence of Autism Spectrum Disorder in developing countries were high especially in India. (Suresh, 2016)

A large portion of the population of India is below 20 years of age but still there is a paucity of information about the prevalence and incidence among developmental disorders. Currently in India, more than ten million people are suffering with Autism Spectrum disorder. It was found about 1 to 1.5% children between ages two and nine in India are being affected with autism (India Today, 2013). The prevalence rate of Autism in India is estimated as one in two hundred and fifty people. Experts estimate that every 2-6 children out of every 1000 have Autism Spectrum disorder (Times of India, 2013).

Along with nutritional deficiencies, many children with Autism Spectrum Disorder face two most common symptoms such as difficulty in eating behaviour and gastrointestinal symptoms which have a significant health, developmental, social and educational impacts. They have difficulties or problems in eating like food selectivity, specific meal time behaviours, following rituals etc. Gastrointestinal symptoms are a

commonly reported concern for parents and may be related to problem in eating behavior and other medical issues. The major areas of gastrointestinal symptoms concern for children with Autism Spectrum Disorder are reflux, abdominal pain, constipation, diarrhea etc. (Daniel, 2012)

BACKGROUND OF THE STUDY

Eating is an important aspect in childhood because it is related to growth and development process. Besides, eating also reflects parent's attention in rearing their children. Feeding difficulties have been observed in children with Autism Spectrum Disorder. Studies reported that children's eating behavior is characterized by food preference, limited variety of food, food refusal, exhibiting disruptive behavior etc. Reviews reported that between forty six to eighty nine percent of children with Autism Spectrum Disorder present with feeding difficulty of some description. Restricted, repetitive behaviour, sameness, distress over trivial changes and interest in following routines or ritual may contribute in the idiosyncratic behaviour. (Ledford and Gast, 2006, Wright et al, 2007). Parents of autistic children reported a more positive attitude about the importance of nutrition (Cemak et.al, 2010).

Children with Autism Spectrum Disorder presents with unique nutritional challenges and nutritional deficiencies. Nutritional deficiencies can be due to various reasons such as narrow food preferences or specific food or texture aversions. Food selectivity has been shown to be an important risk factor in the development of nutritional deficiencies with autism. Children with more restricted diet may be more likely to suffer from inadequate intake of nutrients and develop deficiencies (North American Society for Pediatric Gastroenterology Hepatolgy and Neonatology, 2013)

Feeding is an essential function that affects the quality of life of children with Autism Spectrum Disorder. Pediatric feeding problems are noted if a child's eating behavior interferes with adequate nutritional intake such as weight gain, health and development or if a child demonstrates severely maladaptive and disruptive mealtime behaviours. (Gray, 2003; Noori, M 2014)

Autism children are facing many challenges that often lead to poor dietary pattern. These include problems with sensory processing, eating behaviour and feeding disorders. It is estimated that 46% to 89% of children with Autism Spectrum Disorder experience some kind of problem in eating behaviour. These children refuse to eat unless they sit in the same place, eat on the same dishes and eat the same foods. Some children are sensitive to the way foods feel in their mouth- sensitive to color, texture, smell etc. (Provost, B. 2010; Dawn, 2013; Ranjan, S, 2015).

Increased picky eating and limited dietary variety may put children with Autism Spectrum Disorder at an increased risk for nutritional deficiencies and poor diet quality. A study on relationship between Autism Spectrum Disorder and gastrointestinal symptoms found that abnormalities such as reflux esophagitis correlate with the sudden irritability and aggressive behaviour in Autism Spectrum Disorder, which might be the causes of some behavioural problems in mealtime (Handayan, M, 2012)

Children need certain vital nutrients to function properly that include proteins, fats etc. These key nutrients provide well balanced diet to maintain health. Food additives like artificial colors, preservatives, sweetners can be a particular problem for children with autism spectrum disorder. These foods may have adverse behavioural effects like food selectivity, sensitivity towards food etc. Children with autism spectrum disorder have poor nutritional status, poor digestion, intestinal inflammatory conditions that limit nutrient absorption (Sree, 2014).

Studies reported that children with Autism Spectrum Disorder also exhibited adverse eating patterns and lacked the recommended nutrients important for proper growth and development. There is a strong possibility that gastrointestinal symptoms are related to behavioural patterns. The common gastrointestinal symptoms reported by caregivers of children with Autism Spectrum Disorder are reflux, abdominal pain, constipation, diarrhea, etc. Estimation of prevalence of gastrointestinal dysfunction in children with autism spectrum disorder ranges from 9-70% (George, 2006). The prevalence increases as the children gets older. Special diets such as Gluten Free Casein Free diet (GFCF) are most popular diet used among parents of children with autism spectrum disorder. Still there is no specific proof that such diets alleviate autism symptoms. Hence there is a need to monitor the nutritional status and gastrointestinal symptoms faced by the children with autism spectrum (Yasmeen, 2013)

NEED FOR THE STUDY

Children with Autism Spectrum Disorder and their caregivers face unique challenges in the children's daily eating routines and food intake patterns. Parents and caregivers of children with Autism Spectrum Disorder frequently report that feeding issues are of great concern on an ongoing basis. Those with Autism Spectrum Disorder experience significantly more feeding problems and eat a significantly narrower range of foods than children who do not have autism. Addressing these feeding problems and the core issues behind them is of critical importance to ensure that children with autism are able to thrive. Before parents embark on an aggressive approach to improve their child’s dietary intake, any underlying medical conditions must first be either identified and treated, or ruled out.

Mealtimes pose unique challenges to families of children with Autism Spectrum Disorder. Certain rigid behaviour and routines that manifest in children with Autism Spectrum Disorder extend to meal times and can limit when, where and what type of foods are consumed. A small number of studies and anecdotal report shown that eating difficulties in children with autism spectrum disorder are of concern because they not only increase caregivers stress, but they also put children with Autism Spectrum Disorder at a greater risk for nutritional deficiencies, which may adversely affect the growth and development.

Parents and caregivers of children with Autism Spectrum Disorder were facing significant stress and challenges in giving care for their children. Many studies have reported that there are growing complaints about psychological problems like psychological distress, depression, anxiety among caregivers of children with autism spectrum disorder. Children's aggressive behavior especially while eating and their violent conduct were strongly related to parental stress rather than other symptoms of Autism Spectrum Disorder such as severe developmental delay and adaptive skills (Schieve et.al, 2015).

Dietary pattern, eating difficulties like food preferences, meal time behavior etc. and gastrointestinal symptoms of children poses a great challenge for the child with Autism Spectrum Disorder as well as to the caregiver. Hence the researcher is interested to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children Autism Spectrum Disorder among caregivers at selected special schools in Chennai.

STATEMENT OF THE PROBLEM

A study to assess the dietary pattern, eating behaviour and gastro intestinal symptoms of children with Autism Spectrum Disorder among caregivers at selected special schools in Chennai.

OBJECTIVES OF THE STUDY

1. To assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder
2. To find the correlation between the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder
3. To find the association between the dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder with demographic variables of caregivers and children with Autism Spectrum Disorder.

OPERATIONAL DEFINITIONS

ASSESS

It is the act of obtaining information regarding dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder from caregivers and analyzing the data using statistical method.

DIETARY PATTERN

It refers to the selection of food and its quantity by children with Autism Spectrum Disorder which is assessed using check list and 24 hours dietary recall.

EATING BEHAVIOUR

It refers to the way the children with Autism Spectrum Disorder react and respond during mealtime which is assessed using rating scale.

GASTROINTESTINAL SYMPTOMS

It refers to the manifestations by the children with Autism Spectrum Disorder like nausea, vomiting, heartburns, abdominal pain, indigestion, constipation, diarrhoea etc. and which is assessed using check list.

CHILDREN WITH AUTISM SPECTRUM DISORDER

It refers to the children in the age group of 1-12 years who were diagnosed with Autism Spectrum Disorder and attending special schools

AUTISM SPECTRUM DISORDER

Autism Spectrum Disorder is a complex neurodevelopmental disorder of unknown etiology composed of qualitative alterations in social interaction and verbal impairment with repetitive, restricted, and stereotype behavioral patterns (American Psychological Association, 2000).

CAREGIVERS

It refers to any individual, both male and female who were taking care of the children with Autism Spectrum Disorder\

HYPOTHESIS

H_1: There is a significant relationship between the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder.

H_2: There is a significant association between eating behaviour of children with Autism Spectrum Disorder and demographic variables of caregivers.

ASSUMPTION

The dietary pattern, eating behaviour and gastrointestinal symptoms will differ from child to child with Autism Spectrum Disorder.

DELIMITATION

- The study is limited to 4 weeks of data collection
- The study is limited to children with Autism Spectrum Disorder in selected special schools.
- The study is limited to the age group of children between 1-12 years

PROJECED OUTCOME:

- This study will help to assess the dietary pattern, eating behaviors and gastrointestinal symptoms of children with Autism Spectrum Disorder
- This study will help the investigator to find the relationship between dietary pattern, eating behaviors and gastrointestinal symptoms of children with Autism Spectrum Disorder
- This study will help to find the influence of demographic variables on the dietary pattern, eating behaviors and gastrointestinal symptoms of children with Autism Spectrum Disorder.
- The findings of the study will help the investigator to prepare information booklet to improve dietary pattern and eating behavior of children with Autism Spectrum Disorder

CONCEPTUAL FRAMEWORK

Conceptual framework is a brief explanation of a theory or those portions of theory to be tested in a study (Groove, 2003). Polit and Hungler (1989) described conceptual framework "as a group of mental images or concepts that are related but the relationship is not explicit." It is an abstract and logical structure that enables the researcher to link the findings to the nursing body of knowledge. The conceptual framework gives the idea of the investigator's main view and common themes of the research in the form of the visual diagram by which the investigator explains the specific areas of interest.

The conceptual framework adopted for this study is based on **Pender's Health Promotion Model (2011)**. The model focuses on individual characteristics and experience, behaviour – specific cognition and affect and behavioural outcome.

The health promotion model notes that each person has unique personal characteristics and experiences that affect subsequent actions. It describes the multidimensional nature of person as they interact with the environment to pursue health. The set of variables for behavioural specific knowledge and affect have important motivational significance. The variables can be modified through nursing actions. Health promotion behaviour is the desired behavioural outcome and is the end point in the Health promotion model.

1. Individual characteristics and experience

a. Prior related factors

It refers to the same or similar health behavior in the past. It influences subsequent behaviour through perceived self-efficacy, benefits, barriers and affects related to that activity. In this study it refers to the past behavior of children on dietary

pattern and eating, caregivers past experiences on eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder, family eating practices etc.

b. Personal factors

Personal factors are categorized as biological, psychological and socio- cultural. These factors are predictive of a given behaviour and shaped by the nature of the target behaviour being considered. In this study, it refers to the demographic variables of caregivers such as age, gender, religion, education, relation with the child, occupation, monthly family income, type of family, number of children in the family, food habit. It also refers to the demographic variables of children with Autism Spectrum Disorder such as age, gender, order of the child, food habit, and meal time frequency.

2. Behaviour/specificfactors

These are considered to be very significant in behaviour motivation. They are the core for intervention because they may be modified through nursing actions.

a. Perceived benefits of action

It refers to the perception of the positive or reinforcing consequences of undertaking a healthy behaviour. In this study it refers to benefits of good dietary pattern such as good eating behavior and no or mild gastrointestinal symptoms of children with Autism Spectrum Disorder.

b. Perceived barriers to action

It refers to perception of the blocks, unavailability, difficulties and personal costs of undertaking a healthy behavior. In this study it refers to the perceived problems related to dietary pattern and eating behavior which includes no barriers or barriers related to dietary pattern and eating behaviour. The barriers for dietary pattern are intake of processed, spicy foods, more carbohydrate intake, intake of same food at each meal

etc. and barriers for eating behaviour are satiety responsiveness, food refusal, limited intake of food etc. These barriers for dietary pattern and eating behavior also leads to gastrointestinal symptoms. As dietary pattern and eating behavior improves, the gastrointestinal symptoms decreases.

c. Perceived self efficacy

It refers to one's belief that one is capable of carrying out a healthy behaviour. In this study, it refers to perception of caregivers on dietary pattern, eating behavior and gastrointestinal symptoms. The self efficacy of caregivers and children's ability to follow appropriate dietary pattern, eating behavior and no mild gastrointestinal symptoms.

d. Activity related affect

It refers to the subjective feeling or emotions that occur prior to, during and following a specific health behavior and also whether an individual will repeat or maintain the behaviour. In this study, it refers to positive and negative feeling of caregivers and children with Autism Spectrum Disorder towards dietary pattern, eating behavior and gastrointestinal symptoms.

e. Interpersonal influences

It refers to the feelings, thoughts regarding the beliefs or attitude of others in regard to specific health behaviour. In this study, the interpersonal influences for children with Autism Spectrum Disorder are the influences exerted by family members, siblings, peers, special teachers and other members (non related caregivers).

f. Situational influences

It refers to the perceived options available, demand characteristics, and the aesthetic features of the environment where specific behaviour takes place. In this study, the situational influences for children with Autism Spectrum Disorder are place of eating, time, environment, type of foods provided/ served etc.

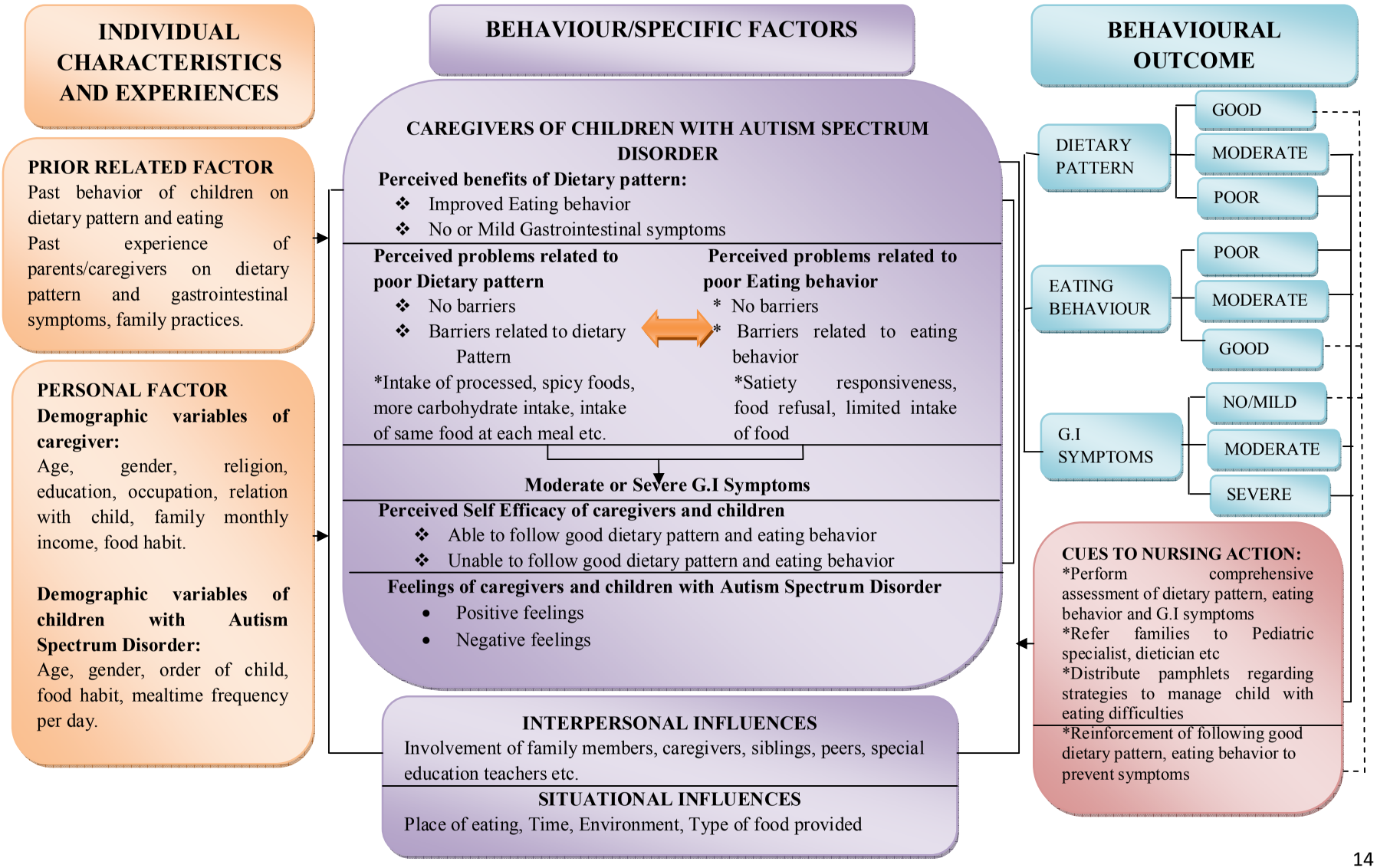
3. Behavioral outcome:

It refers to the desired behavioural outcome of health decision-making and preparation for action. In this study, it refers to the outcome of the assessment on dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder. In which the outcome of the dietary pattern and eating behavior is categorized as good, moderate and poor. The outcome of assessment of the gastrointestinal symptoms of children with Autism Spectrum Disorder is categorized as no/mild, moderate and severe symptoms.

Cues to nursing action:

Health promotion behaviour should result in improved health, enhanced functional ability and better quality of life at all stages of behaviour. Here response of caregivers of children with Autism Spectrum Disorder provide cues for nursing action like comprehensive assessment of dietary pattern, appropriate referral, training programme, community level awareness through health education programme on good dietary pattern and strategies to improve eating behavior, distribution of need based teaching materials and reinforcement of good dietary pattern and eating behaviour.

FIGURE 1: CONCEPTUAL FRAMEWORK BASED ON PENDER'S HEALTH PROMOTION MODEL (2011)



CHAPTER II

REVIEW OF LITERATURE

Review of Literature is the major component of the research process. Literature Review refers to the activities involved in identifying and searching for information on a topic and development of an understanding of the knowledge (Polit)

A literature is an organized written presentation of what has been published on a topic by scholars (Burns & Groove, 2004)

Review of literature relevant to the research study topic was undertaken to gain deeper understanding and insight into the problem. Several text-books, journals, reports, articles, and website were referred to collect maximum information to lay foundation to the study.

The review enabled the investigator to develop an insight into the problem area. Various studies reviewed also helped the investigator in building the base for this study. The review of literature in this chapter is presented under the following headings

Part I: Studies related to dietary pattern of children with Autism Spectrum Disorder

Part II: Studies related to eating behaviour of children with Autism Spectrum Disorder

Part III: Studies related to gastro-intestinal symptoms of children with Autism Spectrum Disorder

PART I: STUDIES RELATED TO DIETARY PATTERN OF CHILDREN WITH AUTISM SPECTRUM DISORDER

Ayse, H. & Ayten, A (2017) conducted a study to assess the dietary pattern of children with Autism Spectrum Disorder. A total of 117 children with the age group of 6-12 years were selected as participants for the study. A general questionnaire, Feeding Assessment Survey (FAS) and a 3-day food records were used to collect the data. The study results showed that 75% of children had inadequate intake of calcium, 25% of children had inadequate intake of zinc, 25% of children had inadequate vitamin intake and 95% of children had daily sodium intake greater than the maximum values not to be exceeded daily. The study concluded that the dietary interventions to be planned and implemented to resolve and improve the identified nutritional problems.

Komal, S (2016) conducted a case control study to assess the macronutrients intake of children with Autism Spectrum Disorder. 40 children with Autism Spectrum Disorder and 40 children without Autism were selected as participants for the study. The data was obtained from mothers of children from both groups using 24 hours diet recall. The study reported that 56% of children with Autism Spectrum Disorder had inadequate energy intake whereas 20% of children without Autism had inadequate energy intake. 63% of children with Autism had inadequate protein intake whereas 35% of children without Autism had inadequate intake of protein. The study concluded that children with Autism Spectrum Disorder were deficient in all categories of daily supply of nutrients when compared to children without Autism

Branhill, K. et al. (2015) conducted a study to assess the dietary intake of children with Autism Spectrum Disorder. A total of 120 children between the age group of 2-14 years were selected for the study. Anthropometric data and 3-day food dairies were used to collect the data. The study results showed that macronutrient consumption

was appropriate for the child, 80% of the children with Autism Spectrum Disorder consumed an adequate amount of calories per day, whereas 20% consumed inadequate amount of calories per day. Majority of the children consumed adequate amount of protein (98.3%), fat (75.8%) and carbohydrate (96.6%) per day. Only 1.6% consumed adequate vitamin D, 26.6% consumed adequate vitamin E and 50% consumed adequate vitamin B. 60% of children with Autism Spectrum Disorder were following elimination diet (Gluten-Casein diet). The study concluded that majority of children with Autism Spectrum Disorder were deficient in vitamins and other several key nutrients such as calcium, magnesium, iodine etc.

Meguid, N (2015) conducted a cross-sectional study to assess the dietary patterns of children with Autism Spectrum Disorder. 80 autistic children divided in two groups (group 1 aged 3-5 years and group 2 aged 6-9 years) were selected as samples for the study. The study results showed that 83% of group 1 and 94% of group 2 autistic children consumed average amount of calories of Recommended Dietary Allowances (RDAs) for their age. Fat intake was more than the Recommended Daily Allowances (RDAs) for their age with high saturated content. Carbohydrates were also within the average intake (54-60%) of the total calorie intake. Proteins intake were slightly high when compared with the expected Recommended Daily Allowance (RDA) but within the normal range when calculated as a percentage of total energy intake. Fibers and cholesterol intakes were within the average values of Recommended Daily Allowances (RDAs) for age and gender.

Shaly, C.M. & Sreesna, O.P (2013) conducted a study to assess the nutrient intake and food consumption of Autistic children in Thrissur. Hundred parents of autistic children between the age group of 4-12 years were selected as samples. Data regarding feeding behavioural problems, nutrient intake and food consumption pattern were

collected. The results showed that 80% of the subjects were non vegetarians. Majority (71%) of the samples followed three meal patterns and 20% had the habit of skipping meals. Most of the children (17%) skipped meals due to dislike for foods. Majority (75%) of them liked eating foods from outside. Frequency of consumption of food items revealed that cereals and other vegetables were found to be the most frequently used food items. Moderately used foods include pulses, fats and oils, sugar and jaggery. The study concluded that feeding problems such as eating behaviour, refusal behavior and food jags were the major reasons for the nutritional inadequacies in autistic children.

PART II: STUDIES RELATED TO EATING BEHAVIOUR OF CHILDREN WITH AUTISM SPECTRUM DISORDER

Prabhakar, T.S. Rekha, R. & Vital, N.S (2015) conducted a study to assess the eating habits for children with Autism in Autism private center, Autism rehabilitation center and tertiary teaching hospital at Vijayawada. The study was conducted on sixty two samples who diagnosed with autism ranging from 6-12years. The data was collected using interview method. The results of the study shown that 56.5% children did not receive balanced diet, nearly half of the children (38.8%) had good eating behavior during watching television. Majority (95%) of the children with autism had food preferences, 71% had favourite food textures, 46% of children with autism preferred food temperatures. The study demonstrated that a less varied diet feeding behavior, limited interests, difficulty in accepting change and type of foods that affected child's weight.

Ranjan, S. & Jennifer (2015) conducted a study to assess nutritional status of individuals with Autism Spectrum Disorder. Nutritional assessment was done by evaluating five different domains: anthropometry, biochemical, clinical, dietary and

environmental approach. The findings showed that 89% of children had difficulty accepting new foods, 46% of children had the habit of difficulty with transition to new textures. Common feeding concerns reported by parents of children with Autism were difficulty accepting new foods and resisting novel experiences that extends to tasting, trying new foods and throwing foods, difficulty with transition to textures, increased sensory sensitivity leading to rejecting food, disruptive meal time behaviour. The study concluded that the children with Autism Spectrum Disorders exhibit nutritional challenges.

Tanner, K. et al. (2014) conducted a study to assess the behavioral and physiological factors associated with selective eating in children with Autism Spectrum Disorder among children of four to ten years age group. Eight seventy two participants were included for the study. By using questionnaire method the data was gathered. The study results shown that 25.3% of children with Autism were taking limited variety of food, 35.7% had the behaviour of food refusal. 56.6% of children had anxiety, ritualistic behaviour during meal time. The study results also revealed that there was no significant difference found between selective and non-selective eaters for age, gender etc.

Diolodi, L. et al. (2014) conducted a case control study to assess the eating habits and dietary patterns in children with Autism. 33 cases and 33 control group were selected as participants. The study results showed that 24% of children with autism and 14% of the control group consumed pulses 2-3 times per week and 12% of children with autism and none in control group consumed rice 4-5 times per week. Dairy products were never consumed by 34.3% of children with autism and 7.2 % of the control group. It also showed that 63% of children with autism ate autonomously without any help from familiar members, compared with 82% of the control group. None of the children in control group needed to be spoon fed by an adult, whereas 15% of the children with

autism needed to be spoon fed. The significant differences were noted between the 6 to 9.5 year age group with autism and control group.

Rathod, S. Mahadevan, S. & Rajkumar, R.P (2014) conducted a case-control study to assess the eating and movement behavior in children with autism in comparison to normal children at a tertiary care hospital in South India. 33 children with autism aged between three to twelve years were taken as cases and 33 developmentally normal children were taken for control groups. Childhood Autism Rating Scale and Vineland Social Maturity Scale were used to determine severity of autism and Social Quotient respectively. Child Eating Behavior Questionnaire and Repetitive Behavior scale-Revised were used to assess the eating and repetitive behavior respectively. The study results showed that mean Child Eating Behavior Questionnaire score among cases was 94.6 and among controls 90.1.Enjoyment of food, slowness in eating, food fussiness and satiety responsiveness were significantly different in the two groups. Repetitive stereotypic movements were seen in 87.8% of children with Autism.

Noori, M. et al (2014) conducted a cross sectional study to determine the prevalence of nutritional related behavioural feeding problems in Autism Spectrum Disorder. By using random sampling technique, 30 children (21 male, 9 female) between the age group of three to eleven years old with Autism Spectrum Disorder were selected as samples. Data was collected using Screening Tool of Feeding Problems (STFP). The study findings indicated that 66.66% of subjects were involved with mild behavioral feeding problems. The results showed that food stealing during meal time was prevalent in 53.33% of children. 26.66% of children with Autism had the habit of eating non-edible items and 26.66% of children had the habit of continuing to eat as long as the food is available.

Handayan, M. Herini, E.S. & Takada, S (2012) conducted a comparative study to assess the eating behavior of autistic children and typically developing children in two different countries, Japan and Indonesia. 39 Japanese and 13 Indonesia parents with autistic children and 197 Japanese and 144 Indonesia parents with typically developing children with the age group of 3-6 years were selected as samples. Data was collected using Brief Autism Mealtime Inventory (BAMBI). Both Japanese and Indonesian autistic parents reported that their children had more food refusal behavior than typically developing children. For limited variety of food behaviours, in both countries, caregivers of autistic children reported that they had more eating beahvioural problems. In preferring same food at each meal, 29% of Japanese autistic children showed significant difference comparing with 9.6% of typically developing children. For preferring food served in particular way, 16.1% Japanese autistic children showed difference with 4.6% typically developing children and 23.1% Indonesian autistic children compared to 3.9% typically developing children. The study results reported that autism children showed more eating behavior problems than typically developing children. The study concluded that the children with autism had delay in eating development that may influence their eating behaviours.

Provost, B. et al (2010) conducted a comparative study to assess the mealtime behaviours of preschool children with Autism Spectrum disorder and Typical Development children. Twenty four children from each group (autism and typically developing children) were selected as samples. The study assessed the meal time locations, mealtime behaviours, eating problems, food preferences etc. The results shown that majority (92%) of children with autism were reported to resist in trying new foods and avoid certain foods and majority (84%) of children with autism were craving for certain foods, 74% of autism children were picky eaters, 59% of children with autism

had the habit of leaving the table frequently during meal time and 41% of children with autism limit their food intake to their food preferences. Regarding meal time location, 54% of children with autism had difficulty in eating at regular restaurants. The study results also reported that 21% of children with Autism had good eating behaviour. The significant differences were found between the pairs of children with ASD and children with Typical Development (TD) like resisting in trying new food, limiting food intake to favorite textures and mouthing nonfood items.

PART III: STUDIES RELATED TO GASTRO-INTESTINAL SYMPTOMS OF CHILDREN WITH AUTISM SPECTRUM DISORDER

Bertrand, J (2015) conducted a study to assess the prevalence of gastrointestinal symptoms of children with Autism spectrum Disorder. A total of 137 children with autism Spectrum Disorder between the age group of 24-96 months were selected as samples. The study results showed that 47% of children with Autism had a history of diarrhea, 37% of the children had constipation and only 17% of children with Autism had abdominal pain. The study concluded that 24% of children with Autism Spectrum Disorder had a history of at least one chronic gastrointestinal symptom and the most common symptom was diarrhea.

Mathew, J (2013) conducted a systematic literature review to assess the gastrointestinal symptoms with Autism. The following databases were used for the study; Medline, Embase, Cinahl and the Cochrane library. The reviews revealed that 24%-63% of children with Autism had moderate to severe diarrhea and constipation, 59% of the children had bloating, gas, reflux. The study concluded that there was a strong correlation between gastrointestinal symptoms and Autism severity which

indicates that the children with more severe Autism were likely to have more severe gastrointestinal symptoms

James, A. & Jick, H (2012) conducted a case control study to assess the relation of gastrointestinal symptoms of children with autism and without Autism. A total of 545 samples with and without Autism were selected for the study. The study results showed that out of 96, 9% of children with autism (cases) and out of 449, 9% of children without autism (controls) had a history of gastrointestinal disorders. Two children with autism (cases) had chronic gastroenteritis and one child had chronic diarrhoea. Three cases (autism) and twelve controls had food intolerances. The estimated odds ratio for gastrointestinal symptoms among children with and without autism was 1.0 (95%).

Badalyan, V. Richard, H. & Schwartz (2012) conducted a comparative study on meal time feeding behaviour and gastrointestinal dysfunction in children with classic Autism and children with normal siblings. The study results showed that the prevalence of gastrointestinal symptoms were more in cases than controls. 35% of cases had constipation while only 16% of controls had constipation. 41% of cases had food allergy and 18% of controls had food allergy. Only 14% of cases had abdominal pain while 9% of controls had abdominal pain. This study concluded that, children with Autism between the age group of 3-12 years had a higher prevalence of gastrointestinal symptoms than the normal siblings.

Handayan, M. Herini, E.S. & Takada, S (2012) conducted a comparative study to assess the eating behavior of autistic children and typically developing children in two different countries, Japan and Indonesia. 39 Japanese and 13 Indonesia parents with autistic children and 197 Japanese and 144 Indonesia parents with typically developing children with the age group of 3-6 years were selected as samples. Data was collected using Brief Autism Mealtime Inventory (BAMBI). The study results showed that

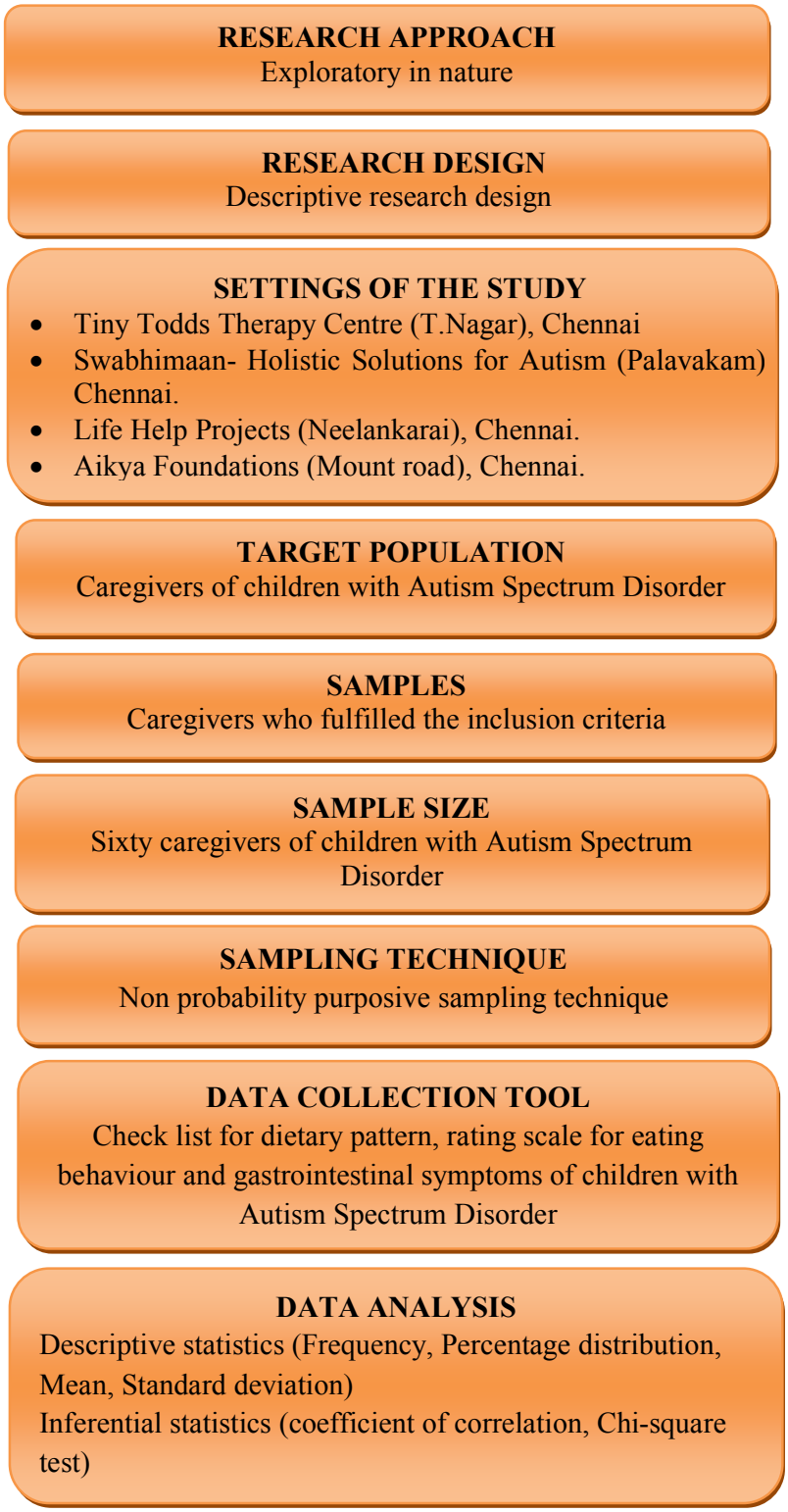
abnormalities such as reflux esophagitis correlate with the sudden irritability and aggressive behavior in Autism Spectrum Disorder, which might be the cause of some behavioral problems in mealtime.

CHAPTER III

RESEARCH METHODOLOGY

This study was undertaken to assess the dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder. This chapter includes research approach, research design, settings of the study, population, sampling technique, criteria for selection of samples, sample size, description of the tool, validity of the tool, pilot study and procedure for data collection and plan for data analysis.

FIGURE 2: SCHEMATIC REPRESENTATION OF METHODOLOGY



RESEARCH APPROACH

The study was exploratory in nature.

RESEARCH DESIGN

A descriptive research design was chosen for the study.

MAJOR VARIABLES OF THE STUDY

Dietary pattern, Eating behaviour and Gastrointestinal symptoms of children with Autism Spectrum Disorder were the major variables of the study

SETTINGS OF THE STUDY

The Pilot study was conducted in Tiny Todds Therapy Centre (T.Nagar), Chennai

The Main study was conducted in the following selected special schools:

- Swabhimaan- Holistic Solutions for Autism (Palavakam), Chennai.
- Life Help Projects (Neelankarai), Chennai.
- Aikya Foundations (Mount road), Chennai.

POPULATION OF THE STUDY

The population for this study included all caregivers of children with Autism Spectrum Disorder and attending selected special schools, Chennai.

SAMPLES OF THE STUDY

The caregivers of children with Autism Spectrum Disorder who fulfilled the inclusion criteria were selected as samples for the study

CRITERIA FOR THE SELECTION OF SAMPLES

INCLUSION CRITERIA FOR CHILDREN

- Both male and female children with Autism Spectrum disorder were included in the study
- Children with Autism Spectrum disorder who were in the age group of 1-12 years

INCLUSION CRITERIA FOR CAREGIVERS

- Both relatives and paid caregivers of children with Autism Spectrum Disorder
- Caregivers who were taking care of children with Autism Spectrum Disorder for more than 6 months
- Caregivers of children with Autism Spectrum Disorder who were available and willing to participate during data collection period in selected special schools, Chennai
- Caregivers of children with Autism Spectrum Disorder who were able to speak, read and write Tamil or English.

EXCLUSION CRITERIA FOR CHILDREN

- Children who were recently diagnosed with Autism Spectrum Disorder
- Children with other medical conditions or other illness such as Cerebral Palsy, Attention Deficit Hyperactivity Disorder etc.

EXCLUSION CRITERIA FOR CAREGIVERS

- Caregivers of children with Autism Spectrum Disorder who participated in the pilot study

SAMPLE SIZE

From the population, a sample of sixty caregivers who fulfilled the inclusion criteria were selected for the study

SAMPLING TECHNIQUE

Non probability purposive sampling technique was used to select the samples. A total of sixty samples were selected from three special schools.

Special schools	Number of samples
Swabhimaan-holistic Solutions for Autism, Chennai	30
Aikya foundations, Chennai	10
Life Help Projects, Chennai	20
Total	**60**

DATA COLLECTION TOOL

Self administered questionnaire was used to collect the demographic data of children with Autism Spectrum Disorder and caregivers of children with Autism Spectrum Disorder. Self administered check list was used to collect the data regarding dietary pattern. Interview method was used to collect 24 hours dietary recall. Self administered rating scale was used to collect data regarding eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder from the caregivers.

DESCRIPTION OF THE TOOL

The tool was prepared based on the information gathered from the review of literature and objectives of the study. It consisted of four parts.

PART I-A: Demographic data of the Caregiver

It consisted of 12 structured questions to assess the demographic variables of caregiver like age, gender, religion, relation with the child, education, occupation, family monthly income, type of family, number of children in the family, number of children affected with Autism, food habit and family history of child with Autism Spectrum Disorder.

PART I-B: Demographic data of the Children with Autism Spectrum Disorder

It consisted of 8 structured questions to assess the demographic variables of child like age, gender, order of the child, type of birth, age at diagnosis, co-morbid conditions, food habit and meal time frequency of the child in a day

PART II: Dietary Pattern

It consisted of 25 items to assess the dietary pattern of children with Autism Spectrum Disorder. It includes two parts: Part-A and Part-B. Part-A consisted of check list to assess the dietary pattern like list of foods to be avoided by the children with Autism Spectrum Disorder. It consisted of 12 statements and each statement with two options such as 'Yes' and 'No'. Part-B consisted of check list which included 13 statements to assess the dietary pattern related to foods to be taken by the children with Autism Spectrum Disorder and a 24 hour dietary recall

PART III: **Eating behavior**

Rating scale was used to assess the eating behavior of children with Autism Spectrum Disorder. It consisted of 35 items to assess the eating behaviors such as satiety responses, emotional under eating, desire to drink, slowness in eating, food refusal,

limited variety of eating and other habits etc. The scale legends for eating behaviors were 'Always', 'Sometimes' and 'Never'. The details were as follows,

Positive item no.	Negative item no.	Total
5,6,7&24	1,2,3,4,8-23&25-35	35

PART IV: Gastrointestinal symptoms

Three point rating scale was used to assess the gastrointestinal symptoms of children with Autism Spectrum Disorder. It consisted of 15 items. The items were related to symptoms like nausea, vomiting, regurgitation, abdominal pain, indigestion, constipation, diarrhea etc. These symptoms were assessed based on No or transient symptoms, occasional or frequent episodic symptoms and continuous or severe symptoms

SCORING AND INTERPRETATION OF DATA

PART II: Dietary pattern

It consisted of 25 items and the maximum total score was 25. The scoring was given based on the sample's response to Yes or No. The scoring for the items were as follows,

Scale legend	Part-A	Part-B
Yes	0	1
No	1	0

The dietary pattern percentage was calculated using the below mentioned formula:

$$\frac{\text{Total marks obtained by the samples}}{\text{Maximum total marks}} \times 100$$

Based on the percentage, dietary pattern of children with Autism Spectrum Disorder were graded as,

GRADE	PERCENTAGE
Poor Dietary Pattern	Less than 50%
Moderate Dietary Pattern	50-74%
Good Dietary Pattern	75% and above

PART III: Eating behaviour

Three point rating scale was used to assess eating behavior of children with Autism Spectrum Disorder. It consisted of totally 4 positive items and 31 negative items. Rating was done based on sample's response to items such as Always, Sometimes and Never. The total score was 70. The scoring for positive and negative items were as follows,

Scale legend	Positive statement	Negative statement
Always	2	0
Sometimes	1	1
Never	0	2

The Eating behavior percentage was calculated using the formula:

$$\frac{\text{Total marks obtained by the samples}}{\text{Maximum total marks}} \times 100$$

Based on the percentage, the eating behavior of children with Autism Spectrum Disorder were graded as,

GRADE	PERCENTAGE
Poor Eating Behaviour	Less than 50%
Moderate Eating Behaviour	50-74%
Good Eating Behaviour	75% and above

PART IV: Gastrointestinal symptoms

It consisted of 15 gastrointestinal symptoms. Rating of the symptoms was done based on factors such as intensity, frequency, duration etc. The total score for the gastrointestinal symptoms were 30. The scoring were as follows,

Symptoms	Score
No or transient symptoms	0
Occasional or frequent episodes symptoms	1
Continuous or severe symptoms	2

Gastrointestinal symptoms percentage was calculated using the formula:

$$\frac{\text{Total marks obtained by the samples}}{\text{Maximum total marks}} \times 100$$

Based on the percentage, the gastrointestinal symptoms of children with Autism Spectrum Disorder were graded as,

GRADE	PERCENTAGE
No symptoms	Less than 25%
Mild symptoms	25-49%
Moderate symptoms	50-74%
Severe symptoms	75% and above

CONTENT VALIDITY OF THE TOOL

The tool was validated by the experts in the field of Pediatric Nursing, Pediatric Medicine and Clinical Nutrition

RELIABILITY

Test- retest method was used to assess the reliability of dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder. The reliability value for dietary pattern, eating behavior and gastrointestinal symptoms tool was 0.78, 0.81 and 0.83 respectively.

PROTECTION OF HUMAN RIGHTS AND ETHICAL CONSIDERATIONS

The study was approved by the ethical committee constituted by the MAC College of Nursing. Permission was obtained from the concerned authority of selected special schools in Chennai. Informed consent was obtained from the samples for their willingness to participate in the study.

PILOT STUDY

After obtaining approval from the research committee in the college, permission was obtained from the Director of Tinny Todds Therapy Centre, T.Nagar, Chennai to conduct the pilot study from 13-7-2016 to 19-7-2016. From the population, 9 caregivers of children with Autism Spectrum Disorder who fulfilled the inclusion criteria were selected using non probability purposive sampling technique. Caregivers of both male and female children with Autism Spectrum Disorder were selected. After self-introduction, a brief introduction about the study was given to the caregivers. After obtaining informed consent from the caregivers of children with Autism Spectrum Disorder, the data was collected.

Self administered questionnaire was used to collect the demographic data of children with Autism Spectrum Disorder and caregivers of children with Autism Spectrum Disorder. Self administered check list was used to collect the data regarding dietary pattern. Interview method was used to collect 24 hours dietary recall. Self administered rating scale was used to collect data regarding eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder. It took approximately 30 - 45 minutes to collect the data from each sample. Both descriptive and inferential statistics were used to analyze the data.

PILOT STUDY RECOMMENDATIONS

The main study was carried out with some modifications in the tool. In the Part-A of dietary pattern tool, the items like child takes pizza, burger, doughnut and artificial sweetners and canned vegetables and fruits were merged into single item as 'child takes processed foods'. In Part-B of dietary pattern tool, based on the recommendations, the ingredients such as cereals, egg and non-vegetarian were also added along with the existing ingredients. The tool for the gastrointestinal symptoms was changed from the checklist with the options Yes or No to rating scale which ranges from 0 to 2 based on recommendations.

DATA COLLECTION PROCEDURE FOR THE MAIN STUDY

After obtaining permission from Principals and Directors of special schools, the main study was carried out. The data was collected from 1.11.2016 to 28.11.2016 in Swabhimaan Holistic Solutions for Autism, Palavakam, Life Help Projects, Neelankarai and Aikya Foundations, Mount road, Chennai. A total of 60 caregivers fulfilling the inclusion criteria were selected using non probability purposive sampling technique. Caregivers of both male and female children with Autism Spectrum Disorder between the age group of 1-12years were selected as samples.

After self-introduction with the samples, a brief introduction about the study was given to the caregivers. The informed consent was obtained from the caregivers for their willingness to participate in the study. After verification of informed consent, the data was collected.

Self administered questionnaire was used to collect data regarding demographic data of children with Autism Spectrum Disorder and caregivers of children with Autism Spectrum Disorder. Self administered check list was used to collect data regarding

dietary pattern and interview method was used to collect 24 hours dietary recall. Self administered rating scale was used to collect data regarding eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder. It took approximately 30 - 45 minutes to collect data from each sample. The samples were very cooperative.

PLAN FOR DATA ANALYSIS

Both descriptive and inferential statistics were used to analyze the data obtained from samples

DESCRIPTIVE ANALYSIS

- Frequency and percentage distribution was used to analyze the demographic variables of caregivers and children with Autism Spectrum Disorder
- Frequency and percentage distribution was used to assess the dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder
- Mean and standard deviation was used to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder

INFERENTIAL STATISTICS

- Coefficient of correlation was used to determine the relationship between the dietary pattern, eating behaviors and gastrointestinal symptoms of children with Autism Spectrum Disorder
- Chi-square was used to associate the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder with the demographic variables of caregiver and children with Autism Spectrum Disorder

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

The analysis is a process of organizing and synthesizing the data in such a way that the research questions can be answered and the hypotheses are tested**.**

This chapter deals with the analysis and interpretation of the data collected from 60 caregivers to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder at selected special schools in Chennai. The data was organized, tabulated and analyzed according to the objectives. Descriptive statistics allows the researcher to organize the data and to examine the quantum of information and inferential statistics is used to determine the relationship and causality. The data were classified and presented under the following sections:

SECTION A: Assessment of Demographic variables of caregivers and children with Autism Spectrum Disorder.

1. Frequency and percentage distribution of the demographic variables of caregivers of children with Autism Spectrum Disorder.
2. Frequency and percentage distribution of the demographic variables of children with Autism Spectrum Disorder.

SECTION B: Assessment of dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder.

3. Frequency and percentage distribution of dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder.
4. Mean and standard deviation of dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder.

SECTION C:

Correlation between dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder.

SECTION D:

Association between dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder with demographic variables of caregivers and children with Autism Spectrum Disorder.

SECTION A

FREQUENCY AND PERCENTAGE DISTRIBUTION OF DEMOGRAPHIC VARIABLES OF CAREGIVERS OF CHILDREN WITH AUTISM SPECTRUM DISORDER.

Table 1.1: Frequency and percentage distribution of demographic variables of caregivers such as age, gender, religion and educational qualification.

N = 60

S.No.	Demographic variable	Frequency (F)	Percentage (%)
1.	**Age**		
	a)Less than 25 years	3	05.00
	b)25 - 35 years	27	45.00
	c)35 - 45 years	24	40.00
	d)Above 45 years	6	10.00
2.	**Gender**		
	a)Male	1	01.67
	b)Female	59	98.33
3.	**Religion**		
	a)Hindu	54	90.00
	b)Christian	3	05.00
	c)Muslim	3	05.00
4.	**Educational qualification**		
	a)Non literate	2	03.33
	b)Primary education	8	13.33
	c)Secondary education	7	11.67
	d)Higher secondary	10	16.67
	e)Graduate	17	28.33
	f)Postgraduate	16	26.67

Table 1.1 shows that, 27 (45%) caregivers were in the age group of 25 – 35 years. Majority 59 (98.33%) of caregivers were females. Majority 54 (90%) of caregivers were Hindus. Regarding educational qualification, 17 (28.33%) caregivers were graduates and 16 (26.67%) caregivers were postgraduates.

Table 1.2: Frequency and percentage distribution of demographic variables of caregivers such as relation with child, occupation, monthly family income and type of family.

N = 60

S.No.	Demographic variable	Frequency (F)	Percentage (%)
5.	**Relation with child**		
	a)Mother	54	90.00
	b)Father	0	0.00
	c)Grandmother	3	05.00
	d)Grandfather	0	0.00
	e)Any related caregiver(warden)	3	05.00
6.	**Occupation**		
	a)Unemployed	51	85.00
	b)Employed	9	15.00
	If employed,		
	i)Private	7	77.78
	ii)Government	0	0.00
	iii)Business	0	0.00
	iv)Daily wages	2	22.22
7.	**Monthly family income**		
	a)Less than Rs.10000/-month	20	33.33
	b)Rs.10001-20000/-month	12	20.00
	c)Rs.20001-30000/-month	7	11.67
	d)Above Rs.30000/-month	21	35.00
8.	**Type of family**		
	a)Joint	26	43.33
	b)Nuclear	30	50.00
	c)Broken	4	06.67

Table 1.2 shows that, majority 54 (90%) of caregivers were mothers. Majority 51 (85%) of caregivers were unemployed and 21 (35%) caregivers monthly family income was above Rs.30000/- month and 20 (33.33%) of them earned less than Rs.10, 000/- month. Thirty (50%) caregivers were belonged to nuclear family and 26 (43.3%) of them were living as joint family.

Table 1.3: Frequency and percentage distribution of demographic variables of caregivers such as number of children in the family, number of children affected with Autism, food habit and family history of Autism.

N = 60

S.No.	Demographic variable	Frequency (F)	Percentage (%)
9.	**Number of children in the family**		
	a)One	22	36.67
	b)Two	33	55.00
	c)Three	3	05.00
	d)Four and above	2	03.33
10.	**Number of children affected with autism**		
	a)One	59	98.33
	b)Two	1	01.67
	c)Three	0	0.00
	d)Four and above	0	0.00
11.	**Food habit**		
	a)Non-vegetarian	13	21.67
	b)Non-vegetarian	47	78.33
	c)Vegan	0	0
12.	**Family history of child with Autism**		
	a)Yes	6	10.0
	b)No	54	90.0

Table 1.3 shows that, 33 (55%) caregivers had two children in their family. Majority 59 (98.33%) of caregivers had one child affected with autism. Majority 47 (78.33%) of caregivers were non-vegetarian and only 6 (10%) caregivers had family history of child with Autism

FREQUENCY AND PERCENTAGE DISTRIBUTION OF THE DEMOGRAPHIC VARIABLES OF CHILDREN WITH AUTISM SPECTRUM DISORDER.

Table 2.1: Frequency and percentage distribution of demographic variables of children with Autism Spectrum Disorder such as age, gender, birth order of the child and type of birth.

N = 60

S.No.	Demographic variable	Frequency (F)	Percentage (%)
1.	**Age**		
	a)1 - 3 Years	6	10.00
	b)3 - 6 years	11	18.33
	c)6 - 9 years	15	25.00
	d)9 - 12 years	28	46.67
2.	**Gender of the child**		
	a)Male	37	61.67
	b)Female	23	38.33
3.	**Birth order of the child**		
	a)First	42	70.00
	b)Second	16	26.67
	c)Third	1	01.67
	d)Fourth	1	01.67
4.	**Type of birth**		
	a)Normal	22	36.67
	b)Cesarean	34	56.67
	c)Instrumental	4	6.67

Table 2.1 shows that, 28 (46.67%) of the children with Autism Spectrum Disorder were in the age group of 9 – 12 years. Regarding gender, 37 (61.67%) children were males. Majority 42 (70%) of children were first born. Regarding type of birth, 34 (56.67%) children were born by cesarean section

Table 2.2: Frequency and percentage distribution of demographic variables of children with Autism Spectrum Disorder such as age at diagnosis, co-morbid conditions, food habit and meal time frequency of the child in a day.

N=60

S.No.	Demographic variable	Frequency (F)	Percentage (%)
5.	**Age at diagnosis**		
	a)Less than 1 year	8	13.33
	b)1 - 2 years	34	56.67
	c)3 - 4 years	14	23.33
	d)4 - 6 years	4	06.67
6.	**Co-morbid conditions**		
	a)Mental retardation	0	0.00
	b)Seizures	1	01.67
	c)Ear infection	0	00.00
	d)Skin allergies	0	00.00
	e)Obsessive compulsive disorder	0	00.00
	f)Learning disability	21	35.00
	g)Hyperactivity	37	61.67
	h)Others, specify (both f & g)	1	01.67
7.	**Food habit**		
	a)Vegetarian	14	23.33
	b)Non-vegetarian	46	76.67
8.	**Meal time frequency of the child in a day**		
	a)One time	1	1.67
	b)Two times	2	3.33
	c)Three times	46	76.67
	d)More than three times	11	18.33

Table 2.2 shows that, 34 (56.67%) children were diagnosed at 1 – 2 years of age. Regarding co-morbid conditions, 37 (61.67%) children had hyperactivity and 21 (35%) children had learning disability. Majority 46 (76.67%) of children were non-vegetarian and 46 (76.67%) children used to take meals three times in a day.

SECTION B

ASSESSMENT OF THE DIETARY PATTERN, EATING BEHAVIOUR AND GASTROINTESTINAL SYMPTOMS OF CHILDREN WITH AUTISM SPECTRUM DISORDER.

Table 3.1: Frequency and percentage distribution of dietary pattern of children with Autism Spectrum Disorder.

N = 60

Variable	Poor Dietary Pattern		Moderate Dietary Pattern		Good Dietary Pattern	
	F	%	F	%	F	%
Dietary Pattern	15	25.0	42	70.0	3	5.0

Table 3.1 shows that, majority 42 (70%) of the children with Autism Spectrum Disorder had moderate dietary pattern, 15 (25%) of them had poor dietary pattern and only 3 (5%) children had good dietary pattern.

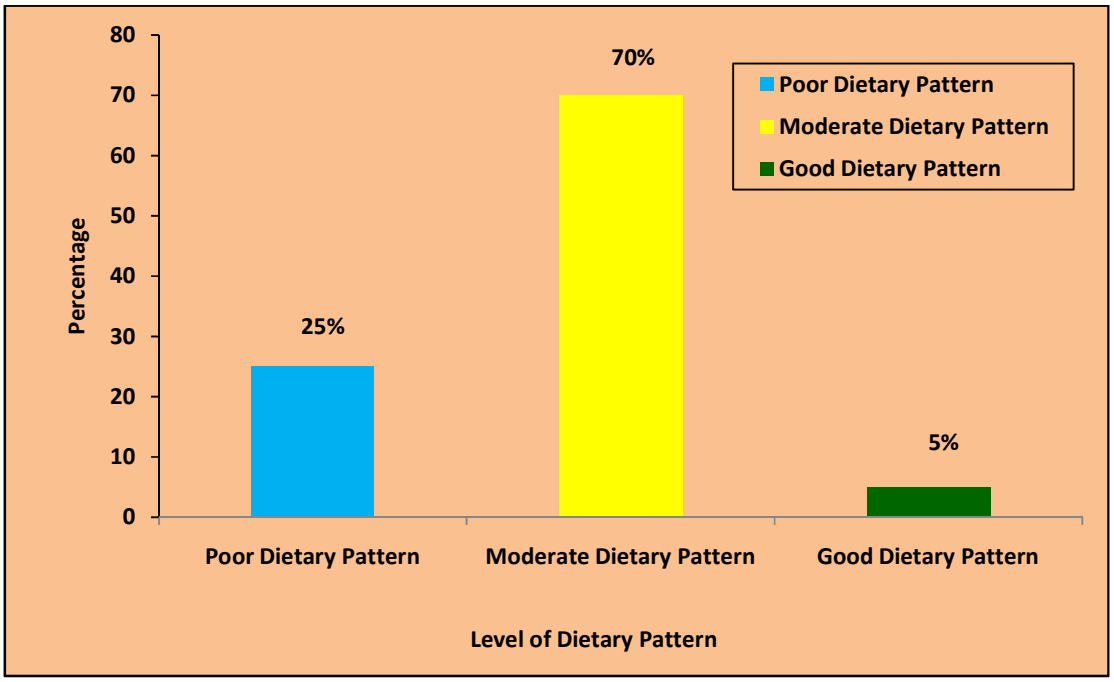


Fig.3: Percentage distribution of dietary pattern of children with Autism Spectrum Disorder

Table 3.2: Frequency and percentage distribution of eating behaviour of children with Autism Spectrum Disorder.

N = 60

Variable	Poor Eating Behaviour		Moderate Eating Behaviour		Good Eating Behaviour	
	F	**%**	**F**	**%**	**F**	**%**
Eating Behaviour	5	8.33	37	61.67	18	30.0

Table 3.2 shows that, majority 37 (61.67%) of the children with Autism Spectrum Disorder had moderate eating behaviour, 18 (30%) of them had good eating behaviour and only 5 (8.33%) children had poor eating behaviour.

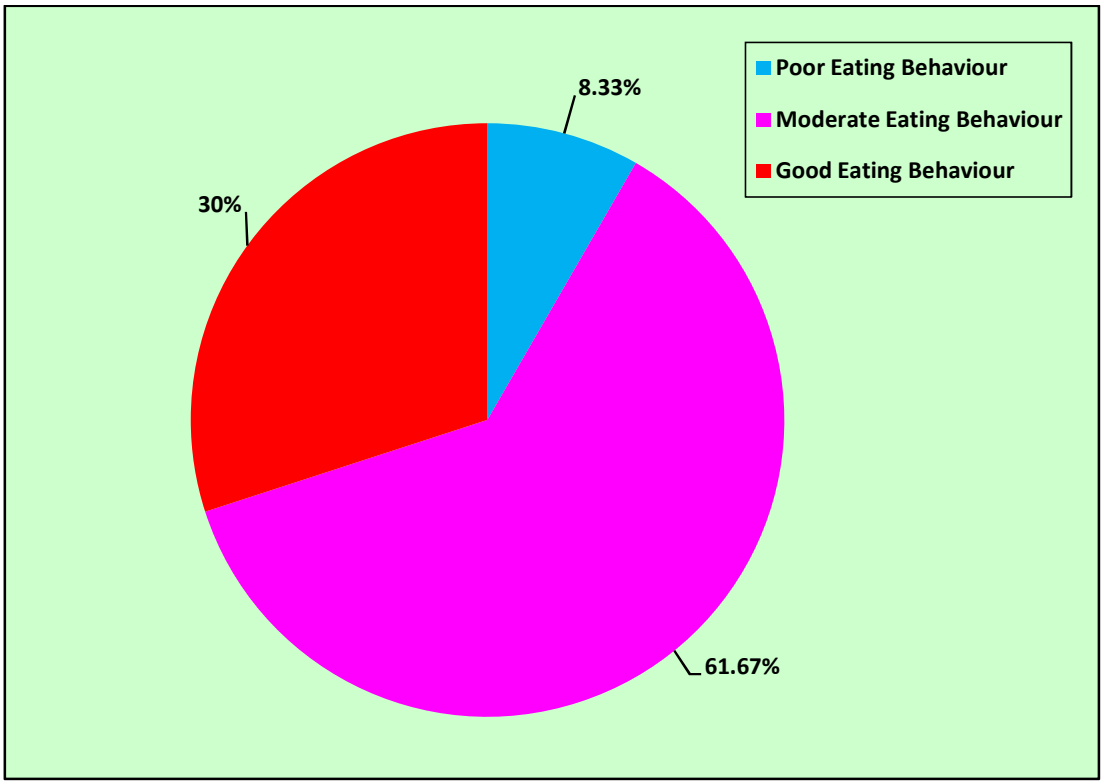


Fig.4: Percentage distribution of eating behaviour of children with Autism Spectrum Disorder

Table 3.3: Frequency and percentage distribution of gastrointestinal symptoms of children with Autism Spectrum Disorder.

N = 60

Variable	No Symptoms		Mild Symptoms		Moderate Symptoms		Severe Symptoms	
	F	%	F	%	F	%	F	%
Gastrointestinal Symptoms	31	51.67	28	46.67	1	1.67	0	0.0

Table 3.3 reveals that, 28 (46.67%) children with Autism Spectrum Disorder had mild gastrointestinal symptoms and only one (1.67%) child had moderate gastrointestinal symptoms.

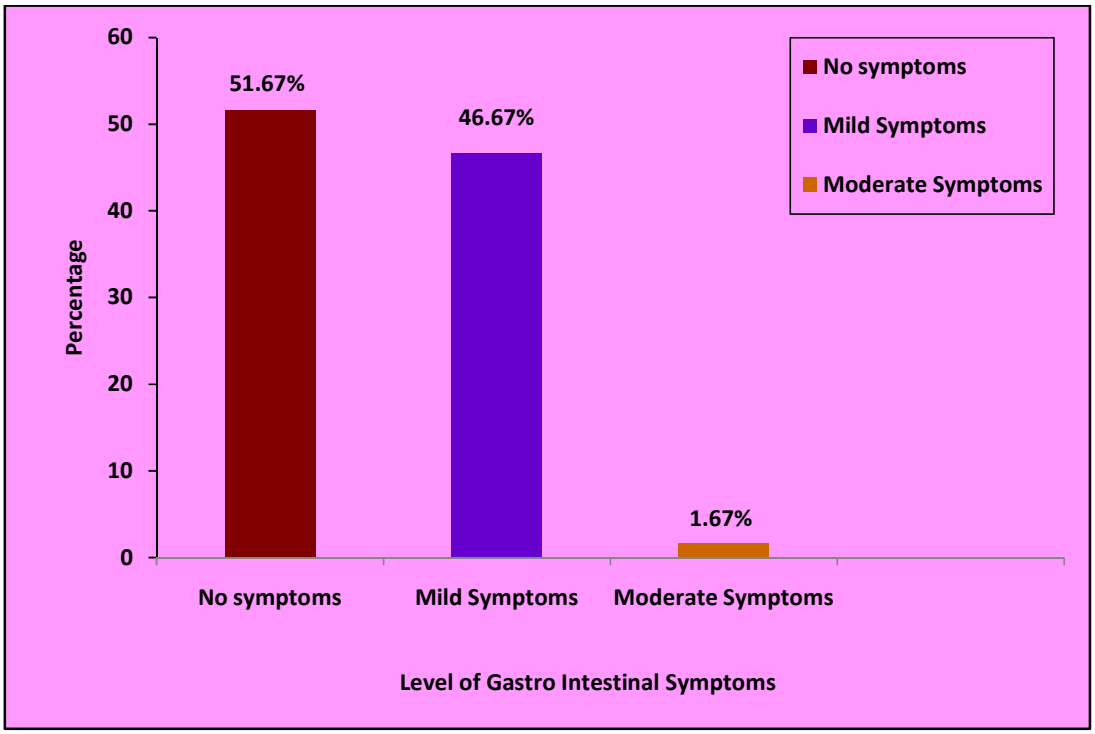


Fig.5: Percentage distribution of gastro intestinal symptoms of children with Autism Spectrum Disorder

Table 4: Mean and Standard deviation of dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder.

N=60

Variables	Mean	S.D
Dietary pattern	11.20	3.24
Eating Behaviour	41.57	11.67
Gastrointestinal symptoms	6.87	3.95

Table 4 shows that, the mean score of dietary pattern of children with Autism Spectrum Disorder was 11.20 with the standard deviation of 3.24, the mean score of eating behaviour of children with Autism Spectrum Disorder was 41.57 with the standard deviation of 11.67 and the mean score of gastrointestinal symptoms of children with Autism Spectrum Disorder was 6.87 with the standard deviation of 3.95.

SECTION C

RELATIONSHIP BETWEEN DIETARY PATTERN, EATING BEHAVIOUR AND GASTROINTESTINAL SYMPTOMS OF CHILDREN WITH AUTISM SPECTRUM DISORDER.

Table 5: Correlation between dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder

N = 60

Variables	'r' Value	'p' Value
Dietary pattern and Eating behaviour	0.642	P=0.000**
Dietary pattern and Gastrointestinal symptoms	-0.464	P=0.000**
Eating behaviour and Gastrointestinal symptoms	-0.503	P=0.000**

** shows significant at 1% level ($p<0.01$)

Table 5 shows that, there was a positive correlation between the dietary pattern and eating behaviour at 1% level of significance. There was a negative correlation between dietary pattern and gastrointestinal symptoms and also between eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder at 1% level of significance.

SECTION D

ASSOCIATION OF DIETARY PATTERN, EATING BEHAVIOUR AND GASTRO INTESTINAL SYMPTOMS OF CHILDREN WITH THE DEMOGRAPHIC VARIABLES OF CAREGIVERS AND CHILDREN WITH AUTISM SPECTRUM DISORDER.

Table 6.1: Association of dietary pattern of children with Autism Spectrum Disorder with the demographic variables of the caregivers such as age, gender, religion, educational qualification.

N = 60

S.No.	Demographic Variables - Caregiver	Poor Dietary Pattern (0 – 8)		Moderate Dietary Pattern (9 – 16)		Good Dietary Pattern (17 – 25)		Chi-Square Value
		F	%	F	%	F	%	
1.	**Age**							χ^2=8.671 d.f=6 p = 0.193 N.S
	a)Less than 25 years	1	1.7	2	3.3	0	0	
	b)25 - 35 years	3	5.0	23	38.3	1	1.7	
	c)35 - 45 years	10	16.7	13	21.7	1	1.7	
	d)Above 45 years	1	1.7	4	6.7	1	1.7	
2.	**Gender**							χ^2=3.051 d.f=2 p = 0.218 N.S
	a)Male	1	1.7	0	0	0	0	
	b)Female	14	23.3	42	70.0	3	5.0	
3.	**Religion**							χ^2=1.593 d.f=4 p = 0.810 N.S
	a)Hindu	14	23.3	37	61.7	3	5.0	
	b)Christian	1	1.7	2	3.3	0	0	
	c)Muslim	0	0	3	5.0	0	0	
	d)Others	-	-	-	-	-	-	
4.	**Educational qualification**							χ^2=6.872 d.f=10 p = 0.738 N.S
	a)Non literate	1	1.7	1	1.7	0	0	
	b)Primary education	3	5.0	5	8.3	0	0	
	c)Secondary education	3	5.0	4	6.7	0	0	
	d)Higher secondary	3	5.0	6	10.0	1	1.7	
	e)Graduate	4	6.7	12	20.0	1	1.7	
	f)Postgraduate	1	1.7	14	23.3	1	1.7	

NS- Not significant S-Significant

Table 6.1 shows that, there was no significant association between the dietary pattern of children and demographic variables of the caregivers such as age, gender, religion, educational qualification

Table 6.2: Association of dietary pattern of children with Autism Spectrum Disorder with the demographic variables of their caregivers such as relation with the child, occupation, monthly family income and type of family.

N = 60

S.No.	Demographic Variables - Caregiver	Poor Dietary Pattern (0 – 8)		Moderate Dietary Pattern (9 – 16)		Good Dietary Pattern (17 – 25)		Chi-Square Value
		F	%	F	%	F	%	
5.	**Relation with child**							χ^2=5.952 d.f=4 p = 0.203 N.S
	a)Mother	13	21.7	39	65.0	2	3.3	
	b)Father	-	-	-	-	-	-	
	c)Grandmother	1	1.7	1	1.7	1	1.7	
	d)Grandfather	-	-	-	-	-	-	
	e)Any related caregiver-specify (warden)	1	1.7	2	3.3	0	0	
6.	**Occupation**							χ^2=0.840 d.f=2 p = 0.657 N.S
	a)Unemployed	12	20.0	36	60.0	3	5.0	
	b)Employed	3	5.0	6	10.0	0	0	
	If employed,							χ^2=0.321 d.f=1 p = 0.571 N.S
	i)Private	2	22.2	5	55.6	-	-	
	ii)Government	-	-	-	-	-	-	
	iii)Business	-	-	-	-	-	-	
	iv)Daily wages	1	11.1	1	11.1	-	-	
7.	**Monthly family income**							χ^2=8.960 d.f=6 p = 0.176 N.S
	a)>Rs.10000/-month	7	11.7	13	21.7	0	0	
	b)Rs.10001-20000/-month	4	6.7	8	13.3	0	0	
	c)Rs.20001-30000/-month	2	3.3	5	8.3	0	0	
	d)<Rs.30000/-month	2	3.3	16	26.7	3	5.0	
8.	**Type of family**							χ^2=1.771 d.f=4 p = 0.778 N.S
	a)Joint	6	10.0	19	31.7	1	1.7	
	b)Nuclear	7	11.7	21	35.0	2	3.3	
	c)Broken	2	3.3	2	3.3	0	0	

N.S – Not Significant S-Significant

Table 6.2 shows that, there was no significant association between the dietary pattern of children and demographic variables such as relation with the child, occupation, monthly family income and type of family of caregivers.

Table 6.3: Association of dietary pattern of children with Autism Spectrum Disorder with the demographic variables of the caregivers such as number of children in the family, number of children affected with Autism, food habit and family history of the child with Autism.

N = 60

S.No.	Demographic Variables - Caregiver	Poor Dietary Pattern (0 – 8)		Moderate Dietary Pattern (9 – 16)		Good Dietary Pattern (17 – 25)		Chi-Square Value
		F	%	F	%	F	%	
9.	**Number of children in the family**							χ^2=2.043 d.f=6 p = 0.916 N.S
	a)One	5	8.3	15	25.0	2	3.3	
	b)Two	8	13.3	24	40.0	1	1.7	
	c)Three	1	1.7	2	3.3	0	0	
	d)Four and above	1	1.7	1	1.7	0	0	
10.	**Number of children affected with autism**							χ^2=0.436 d.f=2 p = 0.804 N.S
	a)One	15	25.0	41	68.3	3	5.0	
	b)Two	0	0	1	1.7	0	0	
	c)Three	-	-	-	-	-	-	
	d)Four and above	-	-	-	-	-	-	
11.	**Food habit**							χ^2=1.052 d.f=2 p = 0.591 N.S
	a)Vegetarian	4	6.7	9	15.0	0	0	
	b)Non-vegetarian	11	18.3	33	55.0	3	5.0	
	c)Vegan	-	-	-	-	-	-	
12.	**Family history of child with autism**							χ^2=0.688 d.f=2 p = 0.709 N.S
	a)Yes	1	1.7	5	8.3	0	0	
	b)No	14	23.3	37	61.7	3	5.0	

N.S – Not Significant S-Significant

Table 6.3 shows that, there was no significant association between dietary pattern of children and demographic variables of the caregivers such as number of children in the family, number of children affected with autism, food habit and family history of child with Autism.

Table 7.1: Association of dietary pattern of children with Autism Spectrum Disorder with their demographic variables such as age, gender of the child, birth order of the child, type of birth, age at diagnosis.

N = 60

S.No.	Demographic Variables – Child	Poor Dietary Pattern (0 – 8)		Moderate Dietary Pattern (9 – 16)		Good Dietary Pattern (17 – 25)		Chi-Square Value
		F	%	F	%	F	%	
1.	**Age**							χ^2=10.712 d.f=6 p = 0.098 N.S
	a)1 - 3 Years	1	1.7	5	8.3	0	0	
	b)3 - 6 years	1	1.7	8	13.3	2	3.3	
	c)6 - 9 years	2	3.3	12	20.0	1	3.7	
	d)9 - 12 years	11	18.3	17	28.3	0	0	
2.	**Gender of the child**							**χ^2=8.813 d.f=2 p = 0.012 S***
	a)Male	14	23.3	21	35.0	2	3.3	
	b)Female	1	1.7	21	35.0	1	1.7	
3.	**Birth order of the child**							χ^2=9.094 d.f=6 p = 0.168 N.S
	a)First	7	11.7	33	55.0	2	3.3	
	b)Second	6	10.0	9	15.0	1	1.7	
	c)Third	1	1.7	0	0	0	0	
	d)Fourth	1	1.7	0	0	0	0	
4.	**Type of birth**							χ^2=1.872 d.f=4 p = 0.759 N.S
	a)Normal	6	10.0	15	25.0	1	1.7	
	b)Cesarean	7	11.7	25	41.7	2	3.3	
	c)Instrumental	2	3.3	2	3.3	0	0	
5.	**Age at diagnosis**							χ^2=0.956 d.f=6 p = 0.987 N.S
	a)Less than 1 year	2	3.3	6	10.0	0	0	
	b)1 - 2 years	9	15.0	23	38.3	2	3.3	
	c)3 - 4 years	3	5.0	10	16.7	1	1.7	
	d)4 - 6 years	1	1.7	3	5.0	0	0	

N.S – Not Significant S-Significant (* Denotes significance at 5%level)

Table 7.1 shows that, there was statistically significant association between dietary pattern and gender of the child at 5% level of significance. There was no significant association between dietary pattern and demographic variables of children such as age, birth order of the child, type of birth and age at diagnosis.

Table 7.2: Association of dietary pattern of children with Autism Spectrum Disorder with their demographic variables such as co-morbid conditions, food habit and meal time frequency of child with Autism.

N = 60

S.No.	Demographic Variables – Child	Poor Dietary Pattern (0 – 8)		Moderate Dietary Pattern (9 – 16)		Good Dietary Pattern (17 – 25)		Chi-Square Value
		F	%	F	%	F	%	
6.	**Co-morbid conditions**							χ^2=6.404 d.f=6 p = 0.379 N.S
	a)Mental retardation	-	-	-	-	-	-	
	b)Seizures	0	0	1	1.7	0	0	
	c)Ear infection	-	-	-	-	-	-	
	d)Skin allergies	-	-	-	-	-	-	
	e)Obsessive compulsive disorder	-	-	-	-	-	-	
	f)Learning disability	7	11.7	14	23.3	0	0	
	g)Hyperactivity	7	11.7	27	45.0	3	5.0	
	h)Any others, specify(f, g)	1	1.7	0	0	0	0	
7.	**Food habit**							χ^2=0.266 d.f=2 p = 0.875 N.S
	a)Vegetarian	3	5.0	10	16.7	1	1.7	
	b)Non-vegetarian	12	20.0	32	53.3	2	3.3	
8.	**Meal time frequency of the child in a day**							χ^2=1.678 d.f=6 p = 0.947 N.S
	a)One time	0	0	0	0	0	0	
	b)Two times	1	1.7	1	1.7	0	0	
	c)Three times	11	18.3	33	55.0	2	3.3	
	d)More than three times	3	5.0	7	11.7	1	1.7	

N.S – Not Significant

Table 7.2 shows that there was no significant association between dietary pattern and demographic variables of the children such as co-morbid conditions, food habit and meal time frequency of child with autism

Table 8.1: Association of eating behaviour of children with Autism Spectrum Disorder with the demographic variables of the caregivers such as age, gender, religion and educational qualification.

N = 60

S.No.	Demographic Variables - Caregiver	Poor Eating Behaviour (0 – 22)		Moderate Eating Behaviour (23 – 47)		Good Eating Behaviour (48 – 70)		Chi-Square Value
		F	%	F	%	F	%	
1.	**Age**							χ^2=9.131 d.f=6 p = 0.166 N.S
	a)Less than 25 years	0	0	2	3.3	1	1.7	
	b)25 - 35 years	3	5.0	12	20.0	12	20.0	
	c)35 - 45 years	1	1.7	20	33.3	3	5.0	
	d)Above 45 years	1	1.7	3	5.0	2	3.3	
2.	**Gender**							**χ^2=11.186 d.f=2 p = 0.004 S****
	a)Male	1	1.7	0	0	0	0	
	b)Female	4	6.7	37	61.7	18	30.0	
3.	**Religion**							χ^2=3.533 d.f=4 p = 0.473 N.S
	a)Hindu	4	6.7	33	55.0	17	28.3	
	b)Christian	1	1.7	2	3.3	0	0	
	c)Muslim	0	0	2	3.3	1	1.7	
	d)Others	-	-	-	-	-	-	
4.	**Educational qualification**							χ^2=16.457 d.f=10 p = 0.087 N.S
	a)Non literate	1	1.7	1	1.7	0	0	
	b)Primary education	1	1.7	6	10.0	1	1.7	
	c)Secondary education	1	1.7	5	8.3	1	1.7	
	d)Higher secondary	2	3.3	6	10.0	2	3.3	
	e)Graduate	0	0	12	20.0	5	8.3	
	f)Postgraduate	0	0	7	11.7	9	15.0	

N.S – Not Significant S-Significant (** Denotes significant at 1% level)

Table 8.1 shows that, there was a statistically significant association between eating behaviour of children and gender of caregiver at 1% level of significance. There was no significant association between the eating behaviour of children and demographic variables of caregivers such as age, religion and educational qualification.

Table 8.2: Association of eating behaviour of children with Autism Spectrum Disorder with the demographic variables of the caregivers such as relation of the child, occupation, monthly family income and type of family.

N = 60

S.No.	Demographic Variables - Caregiver	Poor Eating Behaviour (0 – 22)		Moderate Eating Behaviour (23 – 47)		Good Eating Behaviour (48 – 70)		Chi-Square Value
		F	%	F	%	F	%	
5.	**Relation with child**							χ^2=3.911 d.f=4 p = 0.418 N.S
	a)Mother	5	8.3	33	55.0	16	26.7	
	b)Father	-	-	-	-	-	-	
	c)Grandmother	0	0	3	5.0	0	0	
	d)Grandfather	-	-	-	-	-	-	
	e)Any related caregiver-(warden)	0	0	1	1.7	2	3.3	
6.	**Occupation**							χ^2=0.201 d.f=2 p = 0.904 N.S
	a)Unemployed	4	6.7	32	53.3	15	25.0	
	b)Employed	1	1.7	5	8.3	3	5.0	
	If employed,							χ^2=4.371 d.f=2 p = 0.112 N.S
	i)Private	0	0	4	44.4	3	33.3	
	ii)Government	-	-	-	-	-	-	
	iii)Business	-	-	-	-	-	-	
	iv)Daily wages	1	11.1	1	11.1	0	0	
7.	**Monthly family income**							χ^2=8.935 d.f=6 p = 0.177 N.S
	a)<Rs.10000/-month	2	5.0	15	25.0	2	3.3	
	b)Rs.10001-20000/-month	1	1.7	8	13.3	3	5.0	
	c)Rs.20001-30000/-month	0	0	3	5.0	4	6.7	
	d)>Rs.30000/-month	1	1.7	11	18.3	9	15.0	
8.	**Type of family**							χ^2=2.319 d.f=4 p = 0.677 N.S
	a)Joint	1	1.7	16	26.7	9	15.0	
	b)Nuclear	4	6.7	18	30.0	8	13.3	
	c)Broken	0	0	3	5.0	1	1.7	

N.S – Not Significant S – Significant

Table 8.2 shows that, there was no significant association between the eating behaviour of children and demographic variables of caregivers such as relation with the child, occupation, monthly family income and type of family.

Table 8.3: Association of eating behaviour of children with Autism Spectrum Disorder with the demographic variables of the caregivers such as number of children in the family, number of children affected with Autism, food habit and family history of children with Autism.

N = 60

S.No.	Demographic Variables - Caregiver	Poor Eating Behaviour (0 – 22)		Moderate Eating Behaviour (23 – 47)		Good Eating Behaviour (48 – 70)		Chi-Square Value
		F	%	F	%	F	%	
9.	**Number of children in the family**							χ^2=7.884 d.f=6 p = 0.247 N.S
	a)One	0	0	14	23.3	8	13.3	
	b)Two	4	6.7	20	33.3	9	15.0	
	c)Three	0	0	2	3.3	1	1.7	
	d)Four and above	1	1.7	1	1.7	0	0	
10.	**Number of children affected with autism**							χ^2=0.632 d.f=2 p = 0.729 N.S
	a)One	5	8.3	36	60.0	18	30.0	
	b)Two	0	0	1	1.7	0	0	
	c)Three	-	-	-	-	-	-	
	d)Four and above	-	-	-	-	-	-	
11.	**Food habit**							χ^2=0.427 d.f=2 p = 0.808 N.S
	a)Vegetarian	1	1.7	9	15.0	3	5.0	
	b)Non-vegetarian	4	6.7	28	46.7	15	25.0	
	c)Vegan	-	-	-	-	-	-	
12.	**Family history of child with autism**							χ^2=0.978 d.f=2 p = 0.613 N.S
	a)Yes	1	1.7	4	6.7	1	1.7	
	b)No	4	6.7	33	55.0	17	28.3	

N.S – Not Significant S –Significant

Table 8.3 shows that there was no significant association between eating behaviour of children and demographic variables of caregivers such as number of children in the family, number of children affected with Autism, food habit and family history of children with Autism.

Table 9.1: Association of eating behaviour of children with Autism Spectrum Disorder with their demographic variables such as age, gender of the child, birth order of the child and type of birth.

N = 60

S.No.	Demographic Variables – Child	Poor Eating Behaviour (0 – 22)		Moderate Eating Behaviour (23 – 47)		Good Eating Behaviour (48 – 70)		Chi-Square Value
		F	%	F	%	F	%	
1.	**Age**							χ^2=8.206 d.f=6 p = 0.223 N.S
	a)1 - 3 Years	0	0	3	5.0	3	5.0	
	b)3 - 6 years	1	1.7	4	6.7	6	10.0	
	c)6 - 9 years	1	1.7	9	15.0	5	8.3	
	d)9 - 12 years	3	5.0	21	35.0	4	6.7	
2.	**Gender of the child**							χ^2=1.587 d.f=2 p = 0.452 N.S
	a)Male	3	5.0	25	41.7	9	15.0	
	b)Female	2	3.3	12	20.0	9	15.0	
3.	**Birth order of the child**							**χ^2=12.742 d.f=6 p = 0.047 S***
	a)First	2	3.3	27	45.0	13	21.7	
	b)Second	2	3.3	9	15.0	5	8.3	
	c)Third	0	0	1	1.7	0	0	
	d)Fourth	1	1.7	0	0	0	0	
4.	**Type of birth**							χ^2=3.122 d.f=4 p = 0.538 N.S
	a)Normal	2	3.3	14	23.3	6	10.0	
	b)Cesarean	2	3.3	22	36.7	10	16.7	
	c)Instrumental	1	1.7	1	1.7	2	3.3	
5.	**Age at diagnosis**							χ^2=2.615 d.f=6 p = 0.855 N.S
	a)Less than 1 year	1	1.7	4	6.7	3	5.0	
	b)1 - 2 years	2	3.3	23	38.3	9	15.0	
	c)3 - 4 years	2	3.3	7	11.7	5	8.3	
	d)4 - 6 years	0	0	3	5.0	1	1.7	

N.S – Not Significant S-Significant (* Denotes significant at 5% level)

Table 9.1 shows that, there was a statistically significant association between eating behaviour and the birth order of the child at 5% level of significance. There was no significant association between eating behaviour of children with their demographic variables such as age, gender of the child, type of birth and age at diagnosis.

Table 9.2: Association of eating behaviour of children with Autism Spectrum Disorder with their demographic variables such as co-morbid conditions, food habit and meal time frequency of the child in a day.

N = 60

S.No.	Demographic Variables – Child	Poor Eating Behaviour (0 – 22)		Moderate Eating Behaviour (23 – 47)		Good Eating Behaviour (48 – 70)		Chi-Square Value
		F	%	F	%	F	%	
6.	**Co-morbid conditions**							**χ^2=13.008 d.f=6 p = 0.043 S***
	a)Mental retardation	-	-	-	-	-	-	
	b)Seizures	0	0	1	1.7	0	0	
	c)Ear infection	-	-	-	-	-	-	
	d)Skin allergies	-	-	-	-	-	-	
	e)Obsessive compulsive disorder	-	-	-	-	-	-	
	f)Learning disability	1	1.7	15	25.0	5	8.3	
	g)Hyperactivity	3	5.0	21	35.0	13	21.7	
	h)Any others (f and g)	1	1.7	0	0	0	0	
7.	**Food habit**							χ^2=1.741 d.f=2 p = 0.419 N.S
	a)Vegetarian	0	0	9	15	5	8.3	
	b)Non-vegetarian	5	8.3	28	46.7	13	21.7	
8.	**Meal time frequency of the child in a day**							**χ^2=13.500 d.f=6 p = 0.036 S***
	a)One time	0	0	0	0	1	1.7	
	b)Two times	1	1.7	0	0	1	1.7	
	c)Three times	2	3.3	33	55.0	11	18.3	
	d)More than three times	2	3.3	4	6.7	5	8.3	

N.S – Significant, S – Not Significant (* Denotes significant at 5% level)

Table 9.2 shows that, there was a statistically significant association between eating behaviour and demographic variables of children such as co-morbid conditions and meal time frequency of the child in a day. There was no significant association between eating behaviour and food habit of children

Table 10.1: Association of gastrointestinal symptoms of children with Autism Spectrum Disorder with the demographic variables of the caregivers such as age, gender, religion and educational qualification.

N = 60

S.No.	Demographic Variables - Caregiver	No Symptoms (0 – 25%)		Mild Symptoms (26 – 49%)		Moderate Symptoms (50 – 74%)		Chi-Square Value
		F	%	F	%	F	%	
1.	**Age**							χ^2=10.881 d.f=6 p = 0.092 N.S
	a)Less than 25 years	2	3.3	1	1.7	0	0	
	b)25 - 35 years	15	25.0	11	18.3	1	1.7	
	c)35 - 45 years	8	13.3	16	26.7	0	0	
	d)Above 45 years	6	10.0	0	0	0	0	
2.	**Gender**							χ^2=1.162 d.f=2 p = 0.559 N.S
	a)Male	0	0	1	1.7	0	0	
	b)Female	31	51.7	27	45.0	1	1.7	
3.	**Religion**							**χ^2=19.580 d.f=4 p = 0.001 S****
	a)Hindu	28	46.7	26	43.3	0	0	
	b)Christian	1	1.7	1	1.7	1	1.7	
	c)Muslim	2	3.3	1	1.7	0	0	
	d)Others	-	-	-	-	-	-	
4.	**Educational qualification**							χ^2=15.851 d.f=10 p = 0.104 N.S
	a)Non literate	0	0	2	3.3	0	0	
	b)Primary education	1	1.7	6	10.0	1	1.7	
	c)Secondary education	5	8.3	2	3.3	0	0	
	d)Higher secondary	4	6.7	6	10.0	0	0	
	e)Graduate	11	18.3	6	10.0	0	0	
	f)Postgraduate	10	16.7	6	10.0	0	0	

N.S – Not Significant, S – Significant (** Denotes significant at 1% level)

Table 10.1 shows that, there was a statistically significant association between gastrointestinal symptoms of children and religion at 1% level of significance. There was no significant association between the gastrointestinal symptoms of children and demographic variables of caregiver such as age, gender and educational qualification.

Table 10.2: Association of gastrointestinal symptoms of children with Autism Spectrum Disorder with demographic variables of the caregivers such as relation with the child, occupation, monthly family income and type of family.

N = 60

S.No.	Demographic Variables - Caregiver	No Symptoms (0 – 25%)		Mild Symptoms (26 – 49%)		Moderate Symptoms (50 – 74%)		Chi-Square Value
		F	%	F	%	F	%	
5.	**Relation with child**							χ^2=0.655 d.f=4 p = 0.967 N.S
	a)Mother	27	45.0	26	43.3	1	1.7	
	b)Father	-	-	-	-	-	-	
	c)Grandmother	2	3.3	1	1.7	0	0	
	d)Grandfather	-	-	-	-	-	-	
	e)Any related caregiver (warden)	2	3.3	1	1.7	0	0	
6.	**Occupation**							χ^2=0.463 d.f=2 p = 0.793 N.S
	a)Unemployed	27	45.0	23	38.3	1	1.7	
	b)Employed	4	6.7	5	8.3	0	0	
	If employed,							χ^2=2.057 d.f=2 p = 0.151 N.S
	i)Private	4	44.4	3	33.3	-	-	
	ii)Government	-	-	-	-	-	-	
	iii)Business	-	-	-	-	-	-	
	iv)Daily wages	0	0	2	22.2	-	-	
7.	**Monthly family income**							χ^2=4.844 d.f=6 p = 0.564 N.S
	a)>Rs.10000/-month	8	13.3	11	18.3	1	1.7	
	b)Rs.10001-20000/-month	6	10.0	6	10.0	0	0	
	c)Rs.20001-30000/-month	3	5.0	4	6.7	0	0	
	d)<Rs.30000/-month	14	23.3	7	11.7	0	0	
8.	**Type of family**							χ^2=1.175 d.f=4 p = 0.882 N.S
	a)Joint	11	21.7	13	21.7	0	0	
	b)Nuclear	16	26.7	13	21.7	1	1.7	
	c)Broken	2	3.3	2	3.3	0	0	

N.S-Not Significant S-Significant

Table 10.2 shows that, there was no significant association between gastrointestinal symptoms of children and demographic variables of caregiver such as relation with the child, occupation, monthly family income and type of family.

Table 10.3: Association of gastrointestinal symptoms of children with Autism Spectrum Disorder with the demographic variables of the caregivers such as number of children in the family, number of children affected with Autism, food habit and family history of child with Autism.

N = 60

S.No.	Demographic Variables - Caregiver	No Symptoms (0 – 25%)		Mild Symptoms (26 – 49%)		Moderate Symptoms (50 – 74%)		Chi-Square Value
		F	%	F	%	F	%	
9.	**Number of children in the family**							χ^2=4.184 d.f=6 p = 0.662 N.S
	a)One	11	18.3	11	18.3	0	0	
	b)Two	19	31.7	13	21.7	1	1.7	
	c)Three	1	1.7	2	3.3	0	0	
	d)Four and above	0	0	2	3.3	0	0	
10.	**Number of children affected with Autism**							χ^2=1.162 d.f=2 p = 0.559 N.S
	a)One	31	51.7	27	45.0	1	1.7	
	b)Two	0	0	1	1.7	0	0	
	c)Three	-	-	-	-	-	-	
	d)Four and above	-	-	-	-	-	-	
11.	**Food habit**							χ^2=4.304 d.f=2 p = 0.116 N.S
	a)Vegetarian	10	16.7	3	5.0	0	0	
	b)Non-vegetarian	21	35.0	25	41.7	1	1.7	
	c)Vegan	-	-	-	-	-	-	
12.	**Family history of child with Autism**							χ^2=1.116 d.f=2 p = 0.572 N.S
	a)Yes	2	3.3	4	6.7	0	0	
	b)No	29	48.3	24	40.0	1	1.7	

N.S-Significant S-Significant

Table 10.3 shows that, there was no significant association between gastrointestinal symptoms of children and demographic variables of caregivers such as number of children in the family, number of children affected with Autism, food habit and family history of the child with Autism.

Table 11.1: Association of gastrointestinal symptoms of children with Autism Spectrum Disorder with their demographic variables such as age, gender of the child, birth order of the child, type of birth and age at diagnosis.

N = 60

S.No.	Demographic Variables - Caregiver	No Symptoms (0 – 25%)		Mild Symptoms (26 – 49%)		Moderate Symptoms (50 – 74%)		Chi-Square Value
		F	%	F	%	F	%	
1.	**Age**							χ^2=7.087 d.f=6 p = 0.313 N.S
	a)1 - 3 Years	3	5.0	3	5.0	0	0	
	b)3 - 6 years	7	11.7	3	5.0	1	1.7	
	c)6 - 9 years	9	15.0	6	10.0	0	0	
	d)9 - 12 years	12	20.0	16	26.7	0	0	
2.	**Gender of the child**							χ^2=2.233 d.f=2 p = 0.327 N.S
	a)Male	18	30.0	19	31.7	0	0	
	b)Female	13	21.7	9	15.0	1	1.7	
3.	**Birth order of the child**							χ^2=3.363 d.f=6 p = 0.762 N.S
	a)First	21	35.0	20	33.3	1	1.7	
	b)Second	10	16.7	6	10.0	0	0	
	c)Third	0	0	1	1.7	0	0	
	d)Fourth	0	0	1	1.7	0	0	
5.	**Age at diagnosis**							χ^2=2.176 d.f=6 p = 0.903 N.S
	a)Less than 1 year	5	8.3	3	5.0	0	0	
	b)1 - 2 years	16	26.7	17	28.3	1	1.7	
	c)3 - 4 years	7	11.7	7	11.7	0	0	
	d)4 - 6 years	3	5.0	1	1.7	0	0	
4.	**Type of birth**							χ^2=1.672 d.f=4 p = 0.796 N.S
	a)Normal	11	18.3	11	18.3	0	0	
	b)Cesarean	17	28.3	16	26.7	1	1.7	
	c)Instrumental	3	5.0	1	1.7	0	0	

N.S – Not Significant S-Significant

Table 11.1 shows that, there was no significant association between gastrointestinal symptoms and demographic variables of children such as age, gender of the child, birth order of the child, type of birth and age at diagnosis.

Table 11.2: Association of gastrointestinal symptoms of children with Autism Spectrum Disorder with their demographic variables such as co-morbid conditions, food habit and meal time frequency of the child in a day.

N = 60

S.No.	Demographic Variables - Caregiver	No Symptoms (0 – 25%)		Mild Symptoms (26 – 49%)		Moderate Symptoms (50 – 74%)		Chi-Square Value
		No.	%	No.	%	No.	%	
6.	**Co-morbid conditions**							χ^2=4.043 d.f=6 p = 0.580 N.S
	a)Mental retardation	-	-	-	-	-	-	
	b)Seizures	0	0	1	1.7	0	0	
	c)Ear infection	-	-	-	-	-	-	
	d)Skin allergies	-	-	-	-	-	-	
	e)Obsessive compulsive disorder	-	-	-	-	-	-	
	f)Learning disability	9	15.0	11	18.3	1	1.7	
	g)Hyperactivity	21	35.0	16	26.7	0	0	
	h)Any others (f and g)	1	1.7	0	0	0	0	
7.	**Food habit**							χ^2=2.966 d.f=2 p = 0.227 N.S
	a)Vegetarian	10	16.7	4	6.7	0	0	
	b)Non-vegetarian	21	35.0	24	40.0	1	1.7	
8.	**Meal time frequency of the child in a day**							χ^2=3.323 d.f=6 p = 0.767 N.S
	a)One time	1	1.7	0	0	0	0	
	b)Two times	2	3.3	0	0	0	0	
	c)Three times	22	36.7	23	38.3	1	1.7	
	d)More than three times	6	10.0	5	8.3	0	0	

N.S – Not Significant

Table 11.2 shows that there was no statistically significant association between gastrointestinal symptoms and demographic variables of children such as co-morbid conditions, food habit and meal time frequency of the child in a day.

CHAPTER V

DISCUSSION

This study is aimed to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder among caregivers at selected special schools in Chennai. The review of literature provided the base and in-depth knowledge about the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder.

A descriptive research design was used to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder. A total of 60 samples were selected for the study. The data was analysed and presented in the form of tables and diagrams. The discussion is based on the objectives specified in the study.

Description of sample characteristics

In relation to demographic variables of caregivers

- Twenty (45%) caregivers were in the age group of 25 – 35 years.
- Majority 59 (98.33%) of the caregivers were females.
- Majority 54 (90%) of the caregivers were Hindus.
- Of the total samples, 17 (28.33%) caregivers were graduates and 16 (26.67%) caregivers were postgraduates.
- Majority 54 (90%) of the caregivers were mothers.
- Majority 51 (85%) of the caregivers were unemployed.
- Twenty (35%) caregivers monthly family income was above Rs.30000/- month and 20 (33.33%) of them earned less than Rs.10000/- month.

- Thirty (50%) caregivers were belonged to nuclear family and 26 (43.3%) of them were living as joint family.
- Thirty three (55%) caregivers had two children in their family.
- Majority 59 (98.33%) of the caregivers had one child affected with Autism.
- Majority 47 (78.33%) of the caregivers were non-vegetarian.
- Six (10%) caregivers had family history of child with Autism

In relation to demographic variables of children with Autism Spectrum Disorder

- Twenty eight (46.67%) children with Autism Spectrum Disorder were in the age group of 9 – 12 years.
- Thirty seven (61.67%) children were males.
- Majority 42 (70%) of the children were first born.
- Thirty four (56.67%) children were born by cesarean section
- Thirty four (56.67%) children were diagnosed at 1 – 2 years of age.
- Thirty seven (61.67%) children had hyperactivity and 21 (35%) children had learning disability.
- Majority 46 (76.67%) of the children were non-vegetarian.
- Majority 46 (76.67%) of the children used to take meals three times in a day.

The findings of the study as per objectives are

1. **To assess the dietary pattern, eating behavior and gastrointestinal symptoms of the children with Autism Spectrum Disorder**

Table 3.1 shows that, majority 42 (70%) of the children with Autism Spectrum Disorder had moderate dietary pattern, 15 (25%) of them had poor dietary pattern and only 3 (5%) children had good dietary pattern. It is observed from the study, that

majority of the children with Autism Spectrum Disorder were avoiding Gluten-Casein foods and were taking adequate calories, protein and fat as per Recommened Daily Allowance (RDA)

This finding is supported by Megwid, N (2015) who reported that 83% of children between the age group of 3-5 years and 94% of children between the age group of 6-9 years consumed average amount of calories of Recommended Dietary Allowances (RDAs) for their age. This study also revealed that Autism children who had inadequate dietary pattern also had micronutrient deficiency.

Table 3.2 shows that, majority 37 (61.67%) of the children with Autism Spectrum Disorder had moderate eating behaviour, 18 (30%) of them had good eating behaviour and only 5 (8.33%) children had poor eating behaviour. This result is supported by Beth et.al, (2010) who reported that 21% of children with Autism Spectrum Disorder had good eating behaviour. The similar findings were reported by Prabhakar, T.S. Rekha, R. & Vital, N.S (2015) who reported that nearly half of the children with Autism Spectrum Disorder (38.8%) had good eating behaviour

Findings from a study (Williams et.al, 2005 & Handen, 2008) indicated that food refusal is common among Autistic children which was mainly due to sensory difficulties and lack of communication. Similar findings were reported by Schreck and collegues (2004) who concluded that the children with Autism Spectrum disorder presented with more eating problems related to food refusal, limited variety and specificity in food presentation

Table 3.3 reveals that, 28 (46.67%) children with Autism Spectrum Disorder had mild gastrointestinal symptoms and only one (1.67%) child had moderate gastrointestinal symptoms. The most common symptoms exhibited by children with Autism Spectrum Disorder were constipation and diarrhea.

This finding is in harmony with the findings of a study conducted by Mathew (2013) who reported that gastrointestinal symptoms were higher in children with Autism Spectrum Disorder. The major symptoms reported were bloating or gas, abdominal pain, constipation and diarrhea.

Table 4 shows that, the mean score of dietary pattern of children with Autism Spectrum Disorder was 11.20 with the standard deviation of 3.24, the mean score of eating behaviour of children with Autism Spectrum Disorder was 41.57 with the standard deviation of 11.67 and the mean score of gastrointestinal symptoms of children with Autism Spectrum Disorder was 6.87 with the standard deviation of 3.95.

The study finding shows that the dietary pattern, eating behavior and gastrointestinal symptoms differ in each individual child with Autism Spectrum Disorder. Hence the assumption stated that the dietary pattern, eating behaviour and gastrointestinal symptoms will differ from child to child with Autism Spectrum Disorder is supported.

2. To correlate the dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder.

Table 5 shows that there was a positive significant correlation between dietary pattern and eating behavior (r= 0.642) at 1% level of significance. The result is supported by Ahearn et.al (2001) and Johnson & Handen (2008) who reported that there was a relation between dietary pattern and eating behaviour of children with Autism Spectrum Disorder.

Findings from a study (Colleen Taylor Lukens, 2010) indicated that there was a positive correlation between mealtime behavior and nutritional intake. Eating behavior of children with Autism Spectrum Disorder is of concern because it may put the children at

a greater risk for nutritional deficiencies which may adversely affect their growth and development.

There was a negative correlation between dietary pattern and gastrointestinal symptoms (r= -0.464) and also between eating behavior and gastrointestinal symptoms (r=-0.503) of children with Autism Spectrum Disorder at 1% level of significance.

This finding is supported by Handayan, M (2012) who revealed that there was a negative correlation between the eating behaviour and gastrointestinal symptoms. The study also concluded that, as the eating behaviour improves, the gastrointestinal symptoms decreases.

From the study findings, it is observed that as the dietary pattern and eating behavior improves, the gastrointestinal symptoms decreases. It also found that as eating behavior worsens gastrointestinal symptoms increases. Hence, the first hypothesis stated that there is a significant relationship between the dietary pattern, eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder is accepted.

3. To associate the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder with the demographic variables of caregivers.

Table 6.1 shows that, there was no statistically significant association between the dietary pattern and demographic variables such as age, gender, religion, educational qualification of caregivers of children with Autism Spectrum Disorder.

Table 6.2 shows that, there was no statistically significant association between the dietary pattern and demographic variables such as relation with the child, occupation, monthly family income and type of family of caregivers.

Table 6.3 shows that there was no statistically significant association between dietary pattern and demographic variables such as number of children in the family, number of children affected with autism, food habit and family history of child with Autism.

Table 8.1 shows that, there was statistically significant association found between eating behaviour and gender of caregiver. There was no statistically significant association between the eating behaviour and demographic variables of caregiver such as age, religion and educational qualification.

Table 8.2 shows that, there was no statistically significant association between the eating behaviour and demographic variables of caregiver such as relation with the child, occupation, monthly family income and type of family.

Table 8.3 shows that there was no statistically significant association between eating behaviour and demographic variable of caregiver such as number of children in the family, number of children affected with autism, food habit and family history of children with Autism

Table 10.1 shows that, there was a statistically significant association between gastrointestinal symptoms and religion. There was no significant association between the gastrointestinal symptoms and demographic variables of caregiver such as age, gender and educational qualification.

Table 10.2 shows that there was no statistically significant association between gastrointestinal symptoms and demographic variables of caregiver such as relation with the child, occupation, monthly family income and type of family.

Table 10.3 shows that there was no statistically significant association between gastrointestinal symptoms and demographic variables of caregiver such as number of children in the family, number of children affected with autism, food habit and meal time frequency of child in a day

Hence, the second hypothesis stated that there is an association between eating behavior of children with Autism Spectrum Disorder and demographic variables is accepted.

4. **To associate the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder with their demographic variables.**

Table 7.1 shows that there was a statistically significant association between dietary pattern and gender of the child. There was no statistically significant association between dietary pattern and demographic variables such as age, order of the child, type of birth and age at diagnosis.

Table 7.2 shows that there was no statistically significant association between dietary pattern and demographic variables such as co-morbid conditions, food habit and meal time frequency of child with Autism Spectrum Disorder.

Table 9.1 shows that there was statistically significant association between eating behaviour and order of the child. There was no statistically significant association between eating behaviour and demographic variables such as age, gender of the child, type of birth and age at diagnosis.

The result is supported by Handayan, M (2012) who reported that there was no significant association between the eating behavior and the age and gender of the children with Autism.

Table 9.2 shows that there was statistically significant association between eating behaviour and demographic variables of children such as co-morbid conditions and meal time frequency of the child in a day. There was no statistically significant association between eating behaviour and food habit of children with Autism Spectrum Disorder.

Table 11.1 shows that there was no statistically significant association between gastrointestinal symptoms and demographic variables of children such as age, gender of the child, order of the child, type of birth and age at diagnosis.

Table 11.2 shows that there was no statistically significant association between gastrointestinal symptoms and demographic variables of children such as co-morbid conditions, food habit and meal time frequency of the child in a day.

CHAPTER VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

SUMMARY

The objective of the study was to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai.

A descriptive research design was chosen to assess the dietary pattern, eating behavior and gastrointestinal symptoms of the children with autism spectrum disorder among caregivers. The review of literature provided the base and in depth knowledge for the development of the tool. The content validity of the tool for dietary pattern, eating behavior and gastrointestinal symptoms of children with autism spectrum disorder was obtained from the experts and pilot study was conducted.

The study was conducted in special schools, Chennai after obtaining permission from the Directors and Principals of the schools. The study was conducted among caregivers who fulfilled the inclusion criteria from the selected settings. A total of sixty samples were selected by using non probability purposive sampling technique. Self-administered structured questionnaire was used to collect the data regarding demographic variables of caregivers and children with Autism Spectrum Disorder. Self administered checklist was used to collect data regarding dietary pattern and interview method was used to collect data regarding 24 hour dietary recall. Self administered rating scale was used to collect data regarding eating behavior and gastrointestinal symptoms of children with Autism Spectrum Disorder. Instructions on answering the questions were given to the samples.

The major findings of the study were

In relation to demographic variables of caregivers

- Twenty (45%) caregivers were in the age group of 25 – 35 years.
- Majority 59 (98.33%) of the caregivers were females.
- Majority 54 (90%) of the caregivers were Hindus.
- Of the total samples, 17 (28.33%) caregivers were graduates and 16 (26.67%) caregivers were postgraduates.
- Majority 54 (90%) of the caregivers were mothers.
- Majority 51 (85%) of the caregivers were unemployed.
- Twenty (35%) caregivers monthly family income was above Rs.30000/- month and 20 (33.33%) of them earned less than Rs.10000/- month.
- Thirty (50%) caregivers were belonged to nuclear family and 26 (43.3%) of them were living as joint family.
- Thirty three (55%) caregivers had two children in their family.
- Majority 59 (98.33%) of the caregivers had one child affected with Autism.
- Majority 47 (78.33%) of the caregivers were non-vegetarian.
- Six (10%) caregivers had family history of child with Autism

In relation to demographic variables of children with Autism Spectrum Disorder

- Twenty eight (46.67%) children with Autism Spectrum Disorder were in the age group of 9 – 12 years.
- Thirty seven (61.67%) children were males.
- Majority 42 (70%) of the children were first born.
- Thirty four (56.67%) children were born by cesarean section
- Thirty four (56.67%) children were diagnosed at 1 – 2 years**.**

- Thirty seven (61.67%) children had hyperactivity and 21 (35%) children had learning disability.
- Majority 46 (76.67%) of the children were non-vegetarian.
- Majority 46 (76.67%) of the children used to take meals three times in a day.
- The assessment of dietary pattern of children with Autism Spectrum Disorder showed that majority 42 (70%) of the children with Autism Spectrum Disorder had moderate dietary pattern, 15 (25%) of them had poor dietary pattern and only 3 (5%) children had good dietary pattern.
- The assessment of eating behavior of children with Autism Spectrum Disorder showed that majority 37 (61.67%) of the children with Autism Spectrum Disorder had moderate eating behaviour, 18 (30%) of them had good eating behaviour and only 5 (8.33%) children had poor eating behaviour.
- The assessment of gastrointestinal symptoms of children with Autism Spectrum Disorder showed that 28 (46.67%) children with Autism Spectrum Disorder had mild gastrointestinal symptoms and only 1 (1.67%) child had moderate gastrointestinal symptoms.
- There was a positive significant correlation between dietary pattern and eating behavior (r= 0.642) at 1% level of significance. There was a negative correlation between dietary pattern and gastrointestinal symptoms (r= -0.464) and also between eating behavior and gastrointestinal symptoms (r=-0.503) of children with Autism Spectrum Disorder at 1% level of significance.
- There was a statistically significant association between dietary pattern and gender of the child with Autism Spectrum Disorder at 5% level of significance
- There was a statistically significant association between eating behaviour and gender of the caregiver at 1% level of significance

- There was a statistically significant association between eating behaviour and demographic variables of children with Autism Spectrum Disorder such as birth order of the child, co-morbid conditions and meal time frequency of the child in a day at 5% level of significance
- There was a statistically significant association between gastrointestinal symptoms and religion of the caregiver at 1%level of significance

CONCLUSION

There is preliminary evidence that children with Autism Spectrum Disorder and their caregivers face unique difficulties and challenges in children's dietary pattern, eating behaviour and gastrointestinal symptoms. The study concluded that the children with Autism Spectrum Disorder had moderate dietary pattern, moderate eating behaviour and mild gastrointestinal symptoms. The study proved a significant positive correlation between dietary pattern and eating behavior of children with Autism Spectrum Disorder. There was a statistically significant association between dietary pattern and gender of the child and eating behavior with gender of the caregiver. The study also showed there was a statistically significant association between gastrointestinal symptoms and religion of the caregiver. Nurses play an important role in guiding caregivers and families of children with Autism Spectrum Disorder to improve dietary pattern and eating behaviour

NURSING IMPLICATIONS

Nursing Practice

- Nurses can be trained to perform a comprehensive assessment or screening of dietary pattern, eating behavior and gastrointestinal symptoms
- Nurses can highlight the importance of focusing on small changes in eating behavior of children and reward for child's positive eating behavior to the caregivers of children with Autism Spectrum Disorder.
- Nurses can refer families to appropriate Pediatric specialists, Dietitian, Behaviourist, Psychologist etc. to help to develop a comprehensive health and behavioural plan
- Nurses can refer caregivers to specialty feeding clinics to help to treat children with complex eating difficulties.
- Training programme for nurses can be conducted to face the nutritional issues of children with Autism Spectrum Disorder
- Community level awareness programme can be conducted to the parents or caregivers regarding dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder

Nursing Education

- Nurse educator should teach the nursing students regarding comprehensive assessment of eating behavior and nutritional issues faced by the children with Autism Spectrum Disorder
- Nurse educator can make recommendations to the Indian Nursing Council to include care of special children in terms of dietary pattern, eating behavior etc. in the nursing curriculum.

- Nurse educator can plan a field visit to special schools to observe and learn about the children with Autism Spectrum Disorder.

Nursing Administration

- Nurse administrator can conduct a continuing nursing education programme to address the nutritional issues of children with Autism Spectrum Disorder
- Nurse administrator can develop a comprehensive plan of care to overcome mealtime difficulties of children with Autism Spectrum Disorder
- Nurse administrator can offer mealtime and nutrition management module to the caregivers of children with Autism Spectrum Disorder
- Nurse administrator can prepare pamphlets regarding strategies to manage a child with eating difficulties and can be distributed to Nurses as well to caregivers of the children with Autism Spectrum Disorder

Nursing Research

- The findings of research should be disseminated through conferences, seminars, scientific paper presentation and publishing in nursing journals
- The results to be confirmed by conducting more studies in this same area.
- The results can be utilized for evidenced based nursing practice
- Nurse researcher can explore various measures to improve eating behavior and to reduce gastrointestinal symptoms of children with Autism Spectrum Disorder

RECOMMENDATIONS

Based on the findings of the present study, the following recommendations are made

- A similar study can be conducted on a large sample of children with Autism Spectrum Disorder to confirm and to generalize the study findings
- A study can be conducted to assess the diet quality and eating behaviour of children with Autism Spectrum Disorder
- A Comparative study can be conducted regarding the eating behaviour of children with Autism Spectrum Disorder and children without Autism spectrum Disorder of similar age group.
- A Study can be conducted on sensory perception and nutritional issues of children with Autism Spectrum Disorder
- A study can be conducted to assess the correlation between children's responsiveness to sensory perceptions of foods and eating behaviour.

LIMITATIONS

There were no limitations faced by investigator during the study

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APPENDICES

LETTER SEEKING PERMISSION FOR CONDUCTING THE STUDY

From

D.Jyothsna,
M.Sc (Nursing) I year,
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post,
Adyar,
Chennai- 600113

To

The Director,
Swabhimaan-Holistic Solutions for Autism,
Palkalai nagar,
Palavakam,
Chennai.

Through

The Principal,
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post,
Adyar,
Chennai- 600113

Prof. Dr. (Mrs). R. SUDHA, M.Sc (N)., Ph.D.,
PRINCIPAL
M.A. Chidambaram College of Nursing
VHS Campus, Chennai - 600 113.

Respected sir,

I am D.Jyothsna, M.Sc (Nursing) I year student of M.A.Chidambaram College of Nursing, Voluntary Health Services, Adyar, Chennai.

As a part of the requirement in the M.Sc Nursing programme, as per the TamilNadu Dr.MGR Medical University specification, I have to complete a dissertation. The topic I have selected is **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai".**

I am interested in conducting the study in your esteemed institution. The period of data collection is from 1.11.2016 to 28.11.2016 for the main study.

I assure you sir that my study will not interfere with the routine functioning of the institution. Kindly grant me permission to conduct the study in your institution.

Thanking you sir in anticipation of the favourable response

Place: Chennai

Date: 3-11-16

Yours faithfully

D.Jyothsna

3/11/16

Dr. P.K. Parthiban
Director-Swabhimaan

SWABHIMAAN
Holistic solutions for Autism
Plot No.218 & 301, Palkalai Nagar, Pala...
Chennai - 600 041. Tamil Na...
Ph : 91-44-24511670 Email : ism_c...mail.com
website : www.autismch...

LETTER SEEKING PERMISSION FOR CONDUCTING THE STUDY

From

D.Jyothsna,
M.Sc (Nursing) I year,
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post, Adyar,
Chennai- 600113.

To

The Director,
Tinny Todds Therapy Care,
C.I.T. Nagar,
Nandanam,
Chennai.

Through

The Principal
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post,
Adyar,
Chennai- 600113

R. Sudha

Prof. Dr. (Mrs). R. SUDHA, M.Sc (N)., Ph.D.,
PRINCIPAL
M.A. Chidambaram College of Nursing
VHS Campus, Chennai - 600 113.

Respected Sir,

I am D.Jyothsna, M.Sc (Nursing) I year student of M.A.Chidambaram College of Nursing, Voluntary Health Services, Adyar, Chennai.

As a part of the requirement in the M.Sc Nursing programme, as per the Tamil Nadu Dr.MGR Medical University specification, I have to complete a dissertation. The topic I have selected is **"A study to assess the diet quality, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai".**

I am interested in conducting the study in your esteemed institution. The period of data collection is from 13.7.2016 to 19.7.2016 for the pilot study and from 1.11.2016 to28.11.2016 for the main study.

I assure you sir that my study will not interfere with the routine functioning of the institution. Kindly grant me permission to conduct the study in your institution.

Thanking you sir in anticipation of a favourable response.

Place: Chennai

Date: 15-7-2016

Yours faithfully

D.Jyothsna

M. VINCENT XAVIER, B.O.T., M.O.T.,(Peds.)
PEDIATRIC OCCUPATIONAL THERAPIST
CELL : 99413 50646

LETTER SEEKING PERMISSION FOR CONDUCTING THE STUDY

From

D.Jyothsna,
M.Sc (Nursing) I year,
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post,
Adyar,
Chennai- 600113.

To

The Co-ordinator,
Life Help Projects,
ECR Road,
Neelankarai,
Chennai.

Through

The Principal,
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post,
Adyar,
Chennai- 600113

R. Sudha
Prof. Dr. (Mrs). R. SUDHA, M.Sc (N)., Ph.D.,
PRINCIPAL
M.A. Chidambaram College of Nursing
VHS Campus, Chennai - 600 113.

Respected sir,

I am D.Jyothsna, M.Sc (Nursing) I year student of M.A.Chidambaram College of Nursing, Voluntary Health Services, Adyar, Chennai.

As a part of the requirement in the M.Sc Nursing programme, as per the TamilNadu Dr.MGR Medical University specification, I have to complete a dissertation. The topic I have selected is **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai".**

I am interested in conducting the study in your esteemed institution. The period of data collection is from 1.11.2016 to 28.11.2016 for the main study.

I assure you sir that my study will not interfere with the routine functioning of the institution. Kindly grant me permission to conduct the study in your institution.

Thanking you sir in anticipation of the favourable response.

Place: Chennai

Date: 18-11-2016

THE HANDICAPPED * LIFE HELP CENTRE FOR CHENNAI

Yoursfaithfully

D.Jyothsna

LETTER SEEKING PERMISSION FOR CONDUCTING THE STUDY

From

D.Jyothsna,
M.Sc (Nursing) I year,
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post,
Adyar,
Chennai- 600113

To

The Director,
Aikya Foundation,
New No: 2,
Karpagambal nagar main road,
Mylapore,
Chennai.

Through

The Principal,
M.A.Chidambaram College of Nursing,
Voluntary Health Services,
T.T.T.I Post,
Adyar,
Chennai- 600113

R. Sudha

Prof. Dr. (Mrs). R. SUDHA, M.Sc (N)., Ph.D.,
PRINCIPAL
M.A. Chidambaram College of Nursing
VHS Campus, Chennai - 600 113.

Respected madam,

I am D.Jyothsna, M.Sc (Nursing) I year student of M.A.Chidambaram College of Nursing, Voluntary Health Services, Adyar, Chennai.

As a part of the requirement in the M.Sc Nursing programme, as per the TamilNadu Dr.MGR Medical University specification, I have to complete a dissertation. The topic I have selected is **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai".**

I am interested in conducting the study in your esteemed institution. The period of data collection is from 1.11.2016 to 28.11.2016 for the main study.

I assure you madam that my study will not interfere with the routine functioning of the institution. Kindly grant me permission to conduct the study in your institution.

Thanking you madam in anticipation of the favourable response

Place: Chennai

Date: 4-11-16

Yours faithfully

D.Jyothsna

Director

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool developed by Ms.D.Jyothsna, M.Sc (Nursing) student of M.A.Chidambaram College Of Nursing for the study, **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai"** is validated by the undersigned and she can proceed with this tool to conduct the study.

DATE: 2/11/16

SIGNATURE 2/11/16.

Dr. T. RAVIKUMAR
MBBS, DNB (Ped), PGDip (Adol Ped),PhD (Ped)
Senior Consultant in Pediatrics
Kanchi Kamakoti CHILDS Trust Hospital
12, Nageswara Road, Nungambakkam,
Chennai - 600 034.

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool developed by Ms.D.Jyothsna, M.Sc (Nursing) student of M.A.Chidambaram College Of Nursing for the study, **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai"** is validated by the undersigned and she can proceed with this tool to conduct the study.

DATE: 10/11/16

SIGNATURE

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool developed by Ms.D.Jyothsna, M.Sc (Nursing) student of M.A.Chidambaram College Of Nursing for the study, **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai"** is validated by the undersigned and she can proceed with this tool to conduct the study.

DATE: 04/11/16

SIGNATURE

NESA SATHYA SASIKH
Professor
Apollo CON
Ayanambakkam
Chennai - 95

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool developed by Ms.D.Jyothsna, M.Sc (Nursing) student of M.A.Chidambaram College Of Nursing for the study, **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai"** is validated by the undersigned and she can proceed with this tool to conduct the study.

DATE: 02.11.2016

SIGNATURE

(SUMATHI ROBERT)

Vice Principal

CSI Kalyani College of Nursing

CSI Kalyani General Hospital

Mylapore. Chennai 600004.

CERTIFICATE OF CONTENT VALIDITY

This is to certify that the tool developed by Ms.D.Jyothsna, M.Sc (Nursing) student of M.A.Chidambaram College Of Nursing for the study, **"A study to assess the dietary pattern, eating behaviours and gastrointestinal symptoms of children with autism spectrum disorder among caregivers at selected special schools in Chennai"** is validated by the undersigned and she can proceed with this tool to conduct the study.

DATE:

SIGNATURE

Dr. P. K. Parthiban
Director, Swabhimaan
Holistic Solutions for Autism

SWABHIMAAN
Holistic solutions for Aut
Plot No.218 & 301, Palkalai Nagar, P. ...am,
Chennai - 600 041. Tamil Na...
Ph : 91-44-24511670 Email : ism_ch... ...mail.com
website : www.autismch...nai.in

INFORMED CONSENT FORM

I have been informed about the purpose of the study being conducted by **Ms.D.Jyothsna,** M.Sc (Nursing) of M.A.Chidambaram College of Nursing, Adyar, Chennai and I have no objection in participating in the study. I also give my full Consent for the use of this data for the purpose of any presentation or publication.

Signature:

Name:

Date:

Place:

ஒப்புதல் படிவும்

அடையாறு எம். ஏ. சிதம்பரம் செவிலியர் கல்லூரியில் எம்.எஸ்.சி நர்சிங் பயிலும் திருமதி. ஜோத்ஸ்ன. டி என்பவரால் மேற்கொள்ளப்படும் ஆய்வைப் பற்றி எனக்கு விவரமாக கூறப்பட்டதல், இந்த ஆய்வில் பங்கேற்பதில் எந்த வித ஆட்சேபனையும் இல்லை. மேலும் என்னுடைய விவரங்களை அச்சி லேற்றவும் முழு ஒப்புதல்.

கையொப்பம்:

பெயர்:

தேதி:

இடம்:

TOOL TO ASSESS THE DIETARY PATTERN, EATING BEHAVIOURS AND GASTROINTESTINAL SYMPTOMS OF CHILDREN WITH AUTISM SPECTRUM DISORDER

PART I DEMOGRAPHIC DATA

Instructions: kindly encircle the appropriate option

I-A: DEMOGRAPHIC DATA OF THE CAREGIVER

1. Age
    a) less than 25 years
    b) 25-35 years
    c) 35-45years
    d) Above 45 years

2. Gender
    a) Male
    b) Female

3. Religion
    a) Hindu
    b) Christian
    c) Muslim
    d) Others

4. Educational qualification
    a) Non literate
    b) Primary education
    c) Secondary education
    d) Higher secondary
    e) Graduate
    f) Postgraduate

5. Relation with child
    a) Mother
    b) Father
    c) Grand mother
    d) Grand father
    e) Any related caregiver- specify

6. Occupation
    a) Unemployed
    b) Employed

    If employed,

    i. Private
    ii. Government
    iii. Business
    iv. Daily wages

7. Monthly family income
    a) less than Rs.10000/-month
    b) Rs.10001-20000/-month
    c) Rs.20001-30000/-month
    d) Above Rs.30000/-month

8. Type of family
    a) Joint
    b) Nuclear
    c) Broken

9. Number of children in the family
    a) One
    b) Two
    c) Three
    d) Four and above

10. Number of children affected with autism
    a) One
    b) Two
    c) Three
    d) Four and above

11. Food habit
    a) Vegetarian
    b) Non vegetarian
    c) Vegan

12. Any family history of child with autism
    a) Yes
    b) No

I-B: DEMOGRAPHIC DATA OF THE CHILD WITH AUTSIM SPECTRUM DISORDER

1. Age of the child
    a) 1-3 years
    b) 3-6 years
    c) 6-9 years
    d) 9-12 years

2. Gender of the child
    a) Male
    b) Female

3. Order of the child
    a) First
    b) Second
    c) Third
    d) Fourth

4. Type of birth
    a) Normal
    b) Cesarean
    c) Instrumental

5. Age at Diagnosis
    a) Less than 1 year
    b) 1-2 years
    c) 3-4years
    d) 4-6 years

6. Co-morbid conditions
    a) Mental retardation
    b) Seizures
    c) Ear infections
    d) Skin allergies
    e) Obsessive compulsive disorder
    f) Learning disability
    g) hyperactivity
    h) Any others, specify

7. Food habit
    a) Vegetarian
    b) Non-vegetarian

8. Meal time frequency of the child in a day
    a) One time
    b) Two times
    c) Three times
    d) More than three times

PART II-A

II- A: TOOL TO ASSESS THE DIETARY PATTERN FOR CHILD WITH AUTISM SPECTRUM DISORDER

WHETHER THE CHILD TAKES FOLLOWING ITEMS

S.NO.	ITEM	YES (0)	NO (1)
1.	Child takes easy to eat foods		
2.	Child takes food containing gluten foods (wheat products)		
3.	Child takes casein containing foods (milk and other dairy products)		
4.	Child takes oily and spicy foods		
5.	Child takes noodles		
6.	Child takes bakery products		
7.	Child takes soft drinks		
8.	Child takes taste enhancing rich foods		
9.	Child takes processed food		
10.	Child takes preservatives or additive rich foods		
11.	Child often eats in restaurants		
12.	Child takes carbohydrate rich foods mostly		

II-B: TOOL TO ASSESS THE DIEATRY PATTERN FOR CHILD WITH AUTISM SPECTRUM DISORDER

WHETHER THE CHILD TAKES FOLLOWING ITEMS

S.NO.	INGREDIENTS	1-8 YEARS	9-12 YEARS	YES (1)	NO (0)
1.	Vegetables				
2.	Green leafy vegetables				
3.	Fruits/fruit juices				
4.	Grains				
5.	Nuts and seeds				
6.	Dairy products				
7.	Cereals				
8.	Egg				
9.	Non-vegetarian				
10.	Carbohydrates				
11.	Proteins				
12.	Fats				
13.	Energy				

NOTE:

For vegetables 1 serving = ¼ cup for 1-8 year; 1 serving = ½ cup for 9-12 years

For fruits 1 serving = 1/3 cup for 1-8 year; 1 serving = ½ cup for 9-12 years

For oils 1 serving = 1 tsp

Total score for part A and B is 25

SCORING	INTERPRETATION
0-8	Poor dietary pattern
9-16	Moderate dietary pattern
17-25	Good dietary pattern

PART III

TOOL TO ASSESS THE EATING BEHAVIOUR OF CHILDREN WITH AUTISM SPECTRUM DISORDER

S.NO.	BEHAVIOUR	NEVER	SOMETIMES	ALWAYS
	Satiety responsiveness	NEVER	SOMETIMES	ALWAYS
1.	Child has excessive appetite			
2.	Child leaves food on his/her plate at the end of a meal			
3.	Child gets full before his/her meal is finished			
4.	Child can eat a meal if s/he/she has had a snack just before			
	Emotional undereating	NEVER	SOMETIMES	ALWAYS
5.	Child eats less when she/he is angry			
6.	Child eats less when she/he is tired			
7.	Child eats less when she/he is upset			
	Desire to drink	NEVER	SOMETIMES	ALWAYS
8.	Child takes more water			
	Slowness in eating	NEVER	SOMETIMES	ALWAYS
9.	Child finishes his/her meal very quickly within 5-10 minutes			
10.	Child takes more than 30 minutes to finish a meal			
	Food refusal	NEVER	SOMETIMES	ALWAYS
11.	Child refuses to sit at the table for meals			
12.	Child refuses to self feed			
13.	Child Cries or scream during mealtimes			
14.	Child Turn his/her face or body away from food			

S.NO.	BEHAVIOUR	NEVER	SOMETIMES	ALWAYS
15.	Child spills food from mouth that he /she has eaten			
16.	Child is disruptive during mealtimes			
17.	Child closes mouth tightly when food is presented			
18.	Child is aggressive during mealtimes			
19.	Child refuses to eat foods that require a lot of chewing			
20.	Child is not flexible about mealtime behavior			
	LIMITED VARIETY	NEVER	SOMETIMES	ALWAYS
21.	Dislike certain foods and won't eat them			
22.	Prefers the same food/meal at each time			
23.	Prefers crunchy foods			
24.	Accepts a variety of foods			
25.	Prefers to have food served in a particular way			
26.	Prefers only sweet foods			
27.	Prefers food prepared in particular way			
	OTHER HABITS			
28.	Child steals food from others			
29.	Child tries to vomit to get out of the meal			
30.	Child plays with food			
31.	Child takes food only with spoon and dislikes to touch the food			
32.	Child puts food into his/her mouth but wont chew			

S.NO.	BEHAVIOUR	NEVER	SOMETIMES	ALWAYS
33.	Child is selective/sensitive to flavor, color, texture and temperature of food			
34.	Child wants to eat foods from particular restaraunts			
35.	Child wants to eat non food substances			

For 5-7, 25 positive statements the score is

NEVER- 0

SOMETIMES-1

ALWAYS- 2

From 1-4, 8-24 & 25-35 negative statements the score is

NEVER- 2

SOMETIMES-1

ALWAYS- 0

SCORING	INTERPRETATION
0-23	Poor eating behavior
24-47	Moderate eating behaviour
48-70	Good eating behavior

PART IV

TOOL TO ASSESS THE GASTROINTESTINAL SYMPTOMS OF CHILDREN WITH AUTISM SPECTRUM DISORDER

S.NO.	SYMPTOMS	0	1	2
1.	Nausea			
2.	Vomiting			
3.	Dysphagia			
4.	Regurgitation			
5.	Choking			
6.	Heart burns			
7.	Belching			
8.	Abdominal pain			
9.	Bloating or Gaseousness/Abdominal distension			
10.	Indigestion			
11.	Flatus			
12.	Constipation			
13.	Diarrhea			
14.	Discolored watery stools			
15.	Foul smelling stools			

SCORING	INTERPRETATION
0-3	No problem
4-7	Mild problem
8-11	Moderate problem
12-15	Severe problem

ஆட்டிசக் குழந்தையின் உணவு முறைகள், உணவு பழக்க வழக்க முறைகள் மற்றும் உணவுக்குழாய் சம்பந்தமான கேள்விகள்

பிரிவு-I-தகவல் சேகரிப்பு படிவம்

I-A ஆட்டிசம் உள்ள குழந்தையை பராமரிப்பவர்கள் பற்றிய தகவல் சேகரிப்பு படிவும்

சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக:-

1) வயது

அ) 25 வயதுக்கு கீழ்

ஆ) 25-35 வயது

இ) 35-45 வயது

ஈ) 45 வயதுக்கு மேல்

2) பாலினம்

அ) ஆண்

ஆ) பெண்

3) மதம்

அ) இந்து

ஆ) கிறிஸ்துவர்

இ) முஸ்லீம்

ஈ) மற்றவை எனில் குறிப்பிடுக

4) கல்வித்தகுதி

அ) படிக்காதவர்

ஆ) எட்டாம் வகுப்பு வரை

இ) பத்தாம் வகுப்புவரை

ஈ) பன்னிரண்டாம் வகுப்பு வரை

உ) பட்டதாரி

ஊ) முதுகலை பட்டதாரி

5) குழந்தையுடனான உறவு

அ) அம்மா

ஆ) அப்பா

இ) பாட்டி

ஈ) தாத்தா

உ) மற்றவர்கள் எனில் குறிப்பிடுக

6) வேலை

அ) வேலை இல்லாதவர்கள்

ஆ) வேலையில் உள்ளவர்கள்

வேலை செய்பவராக இருந்தால்

அ) தனியார்

ஆ) அரசு

இ) வியாபாரம்

ஈ) தினசரி கூலி வேலை

7) குடும்பத்தின் மாத வருமானம்

அ) ரூ.10,000/-கீழ்

ஆ) ரூ.10001 - 20,000/- மாதம்

இ) ரூ. 20001 - 30,000/- மாதம்

ஈ) ரூ. 30, 000 மாதம் மேல்

8) குடும்பத்தின் வகைகள்

அ) கூட்டுக் குடும்பம்

ஆ) தனிக் குடும்பம்

இ) சிதைந்த குடும்பம்

9.குடும்பத்தில் உள்ள குழந்தைகளின் எண்ணிக்கை

அ) ஒன்று

ஆ) இரண்டு

இ) மூன்று

ஈ) நான்கு மற்றும் நான்கு குழந்தைகளுக்கு மேல்

10. ஆட்டிசம் என்ற நோயால் பாதிக்கப்பட்ட குழந்தைகள் எண்ணிக்கை

அ) ஒன்று

ஆ) இரண்டு

இ) மூன்று

ஈ) நான்கு குழந்தைகளுக்கு மேல்

11. உணவு பழக்கம்

அ) சைவம்

ஆ) அசைவம்

இ) சைவ உணவு (முட்டை மற்றும் பால்கூட தவிரத்து)

12. உங்கள் குடும்பத்தில் எவருக்கேனும் ஆட்டிசம் உள்ளதா?

அ) ஆம்

ஆ) இல்லை

I-B ஆட்டிசம் உள்ள குழந்தையின் தகவல் சேகரிப்பு படிவம்:-

சரியான விடையைத் தேர்ந்தெடுத்து எழுதுக:

1) குழந்தையின் வயது

அ) 1-3 வயது

ஆ) 3-6 வயது

இ) 6-9 வயது

ஈ) 9-12 வயது

2) குழந்தையின் பாலினம்

அ) ஆண்

ஆ) பெண்

3) குடும்பத்தில் எத்தனாவது குழந்தை

அ) முதலாவது

ஆ) இரண்டாவது

இ) மூன்றாவது

ஈ) நான்காவது

4) பிறப்பின் முறை

அ) சுகபிரசவம்

ஆ) அறுவை சிகிச்சை

இ) ஆயுதம்

5) எந்த வயதில் கண்டுப்பிடிக்கப்பட்டது

அ) 1 வயதுக்கு கீழ்

ஆ) 1 - 2 வயது

இ) 3 - 4 வயது

ஈ) 4 - 6 வயது

6) ஆட்டிசத்தை சார்ந்த மற்ற பிரச்சனைகள்

அ) மனநிலை பாதிக்கப்பட்டவர்

ஆ) வலிப்பு

இ) காது தொற்று

ஈ) தோல் ஒவ்வாமை

உ) மன சுழற்சி நோய்

ஊ) கற்றுக்கொள்வதில் சிரமம்

எ) இயற்கை மீறிய சுறுசுறுப்பு

ஏ) மற்றவை எனில் குறிப்பிடுக

7) உணவுப் பழக்கம்

அ) சைவம்

ஆ) அசைவம்

8) ஒரு நாளைக்கு எத்தனை முறை குழந்தை உணவு எடுத்துக் கொள்ளும்

அ) ஒரு முறை

ஆ) இரு முறை

இ) மூன்று முறை

ஈ) மூன்று முறைக்கு மேல்

பிரிவு -II A-ஆட்டிசம் உள்ள குழந்தைகளின் உணவு பழக்க வழக்க முறைகள்

சரியான வாக்கியத்திற்கு எதிராக பொருத்தமான இடத்தில் (✓) குறியிடுக.

வ.எண்	வாக்கியங்கள்	ஆம்	இல்லை
1	குழந்தை எளிமையான உணவை உண்ணும்		
2	குழந்தை கோதுமை சம்பந்தப்பட்ட உணவுகள் உள்ள உணவை உண்ணும்		
3	குழந்தை பால் மட்டும் பால் சார்ந்த பொருட்களை எடுத்துக்கொள்ளும்		
4	குழந்தை எண்ணெய் மசாலா பொருட்களை எடுத்துகொள்ளும்		
5	குழந்தை நூடுல்ஸ் எடுத்துகொள்ளும்		
6	குழந்தை பேக்கிரிப் பொருட்களை உண்ணும்		
7	குழந்தை மென்பானங்கள் குடிக்கும்		
8	குழந்தை சுவைஅதிகமான பொருட்களை எடுக்கும்		
9	குழந்தை பதப்படுத்தப்பட்ட உணவை உண்ணும்		
10	குழந்தை செயற்கை முறையில் தயாரிக்கப்பட்ட உணவுகளை எடுக்கும்		
11	குழந்தை எப்பொழுதும் ஹோட்டலில் உணவுப் பொருட்களை உண்ணும்		
12	குழந்தை கார்போஹைட்ரேட் நிறைந்த உணவுப் பொருட்களை எப்பொழுதும் எடுக்கும்		

பிரிவு -II-B-ஆட்டிசம் உள்ள குழந்தைகளின் உணவு பழக்க வழக்க முறைகள்

சரியான வாக்கியத்திற்கு எதிராக பொருத்தமான இடத்தில் (✓) குறியிடுக.

வ.எண்	உணவுகள்	1 - 8 வயது	9 - 12 வயது	ஆம்	இல்லை
1	காய்கறிகள்				
2	கீரை வகைகள்				
3	பழங்கள்/ பழச்சாறு				
4	தானியங்கள்				
5	கொட்டைகள்				
6	பால் வகைகள்				
7	பருப்பு வகைகள்				
8	முட்டை				
9	அசைவ உணவுகள்				
10	கார்போ ஹைட்ரேட் / கலோரிகள்				
11	புரதம்				
12	கொழுப்பு				
13	சக்தி நிறைந்த உணவு				

பிரிவு -III-ஆட்டிசம் உள்ள குழந்தைகளின் உணவு பழக்க வழக்க முறைக்கள்

சரியான வாக்கியத்திற்கு எதிராக பொருத்தமான இடத்தில் (✓) குறியிடுக.

வ. எண்	உணவு பழக்க, வழக்கம்	எப்பொழுதும் இல்லை	சில சமயம்	எப்பொழுதும்
1	குழந்தைக்கு பெரும்பசி இருக்கும்			
2	குழந்தை சாப்பிட்டு முடியும் வேலையில் சிறிதளவு உணவை தட்டில் வைத்துவிடும்			
3	குழந்தை போதுமான உணவு உண்ணும் முன் வயிறு நிரம்பிவிடும்			
4	குழந்தை உணவு உண்ணும் முன் திண்பண்டங்கள் சாப்பிட்டு இருந்தாலும் உணவு உண்ண முடியும்			
5	குழந்தை கோபத்தில் இருக்கும் போது கொஞ்சமான உணவை உண்ணும்			
6	குழந்தை சோர்வாக இருக்கும் போது கொஞ்சமாக உணவை உண்ணும்			
7	குழந்தை நிலைகுலைந்த (upset) நேரத்தில் கொஞ்சமாக உணவை உண்ணும்			
8	குழந்தை அதிக அளவு தண்ணீர் குடிக்கும்			
9	குழந்தை 5-10 நிமிடங்களில் அதி வேகமாக சாப்பிட்டு முடித்து விடும்			
10	குழந்தை 30 நிமிடங்களுக்கு மேல் உணவு உண்ண எடுத்துக் கொள்ளும்			
11	குழந்தை உணவு உண்ண மேஜையில் உட்கார மாட்டார்கள்			
12	குழந்தை தானாக உணவு சாப்பிட மறுப்பார்கள்/ மாட்டார்கள்			
13	குழந்தை சாப்பிடும் நேரத்தில் அழுகும் அல்லது கத்தும்			
14	குழந்தை முகத்தை அல்லது உடலை உணவில் இருந்து தூரம் திரிப்பிக் கொள்ளும்			

வ. எண்	உணவு பழக்க, வழக்கம்	எப்பொழுதும் இல்லை	சில சமயம்	எப்பொழுதும்
15	குழந்தை சாப்பிட்ட உணவை விழுங்காமல் துப்பி விடுவார்கள்			
16	குழந்தை உணவு உண்ணும்போது அமைதியான மனநிலையில் இருக்க மாட்டார்கள்			
17	குழந்தை உணவு ஊட்டும் போது வாயை இறுக்க மூடிக் கொள்வார்கள்			
18	குழந்தை உணவு சாப்பிடும் வேலையில் வன்மையாக (அக்க்ரெசிவே) நடந்து கொள்வார்கள்			
19	குழந்தை நீண்ட நேரம் மென்று முழுங்கக் கூடிய உணவுகளை வேண்டாம் என்று தவிர்ப்பார்கள்			
20	குழந்தை உணவு உண்ணும் முறைகளை/ பழக்கத்தை மாற்றிக் கொள்ள மாட்டார்கள்			
21	குழந்தை ஒரு சில உணவுப் பொருட்களை விரும்ப மாட்டார்கள் மற்றும் அவற்றை சாப்பிடவும் மாற்றார்கள்			
22	குழந்தை ஒரே வகையான உணவை ஒவ்வொரு முறையும் விரும்புவார்கள்			
23	குழந்தை மொருமொருப்பான உணவுப் பொருட்களை விரும்புவார்கள்			
24	குழந்தை விதவிதமான உணவுப் பொருட்களை விரும்பி ஏற்றுக்கொள்வார்கள்			
25	குழந்தை ஒரே மாதிரியான முறையில் உணவு பரிமாறுவதை விரும்புவார்கள்			
26	குழந்தை இனிப்பு வகைகளை மட்டும் விரும்பி உண்பார்கள்			
27	குழந்தை ஒரே மாதிரியான முறையில் சமைத்த உணவை விரும்புவார்கள்			
28	குழந்தை அடுத்தவர் உணவை எடுத்து உட்கொள்ளும்			
29	குழந்தை உணவை கண்டு வாந்தி எடுக்க முயற்சி செய்து சாப்பிடுவதிலிருந்து வெளியேறுவார்கள்			

வ. எண்	உணவு பழக்க, வழக்கம்	எப்பொழுதும் இல்லை	சில சமயம்	எப்பொழுதும்
30	குழந்தை உணவை கொண்டு / வைத்து விளையாடும்			
31	குழந்தை உணவை கரண்டியில்(ஸ்பூன்) மட்டும் உட்கொள்ளும் மற்றும் கையில் தொட விரும்பாது			
32	உணவை வாயில் எடுத்து கொள்வார்கள் ஆனால் மென்று விழுங்கமாட்டார்கள்			
33	குழந்தை குறிப்பிட்ட ஒரே நிற, பதமான, வெப்பநிலையில் உள்ள உணவை தேர்ந்தெடுத்து உண்பார்கள்			
34	குழந்தை ஒரு குறிப்பிட்ட உணவகத்தில் மட்டும் உணவை உண்பார்கள்			
35	குழந்தை சாப்பிடக்கூடாத சில பொருட்களை உண்பார்கள்			

பகுதி- IV -உணவுக்குழாய் சம்பந்தமான அறிகுறிகள்

சரியான வாக்கியத்திற்கு எதிராக பொருத்தமான இடத்தில் (✓) குறியிடுக.

வ.எண்	அறிகுறிகள்	0	1	2
1	குமட்டல்			
2	வாந்தி			
3	கஷ்டமாக விழுங்குதல்			
4	எதிர்க்களித்தல்			
5	மூச்சு விடாதப்படி அடைத்தல்			
6	நெஞ்சு எரிச்சல்			
7	ஏப்பம்			
8	வயிற்று வலி			
9	வயிறு உப்பசம்			
10	செரிப்பிண்மை			
11	வாயுத்தொல்லை			
12	மலச்சிக்கல்			
13	வயிற்றுப்போக்கு			
14	நிறம் மாறிய மலம்			
15	துர்நாற்றம் கல்ந்த மலம்			

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This is to certify that Ms.D.Jyothsna, II year M.Sc., (Nursing) student of M.A.Chidambaram College of Nursing, Adyar, Chennai, conducted a dissertation work on **"A study to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder among caregivers at selected special schools in Chennai."** has been edited by me for English language appropriateness.

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CERTIFICATE OF TAMIL EDITING

This is to certify that the dissertation done for **"A study to assess the dietary pattern, eating behaviour and gastrointestinal symptoms of children with Autism Spectrum Disorder among caregivers at selected special schools in Chennai",** by Ms.D.Jyothsna, M.Sc., (Nursing) student of M.A. Chidambaram College of Nursing, Adyar, Chennai, has been edited by me for Tamil language appropriateness.

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